IN SEARCH OF OUR ANCESTORS

MARY·E·BOYLE

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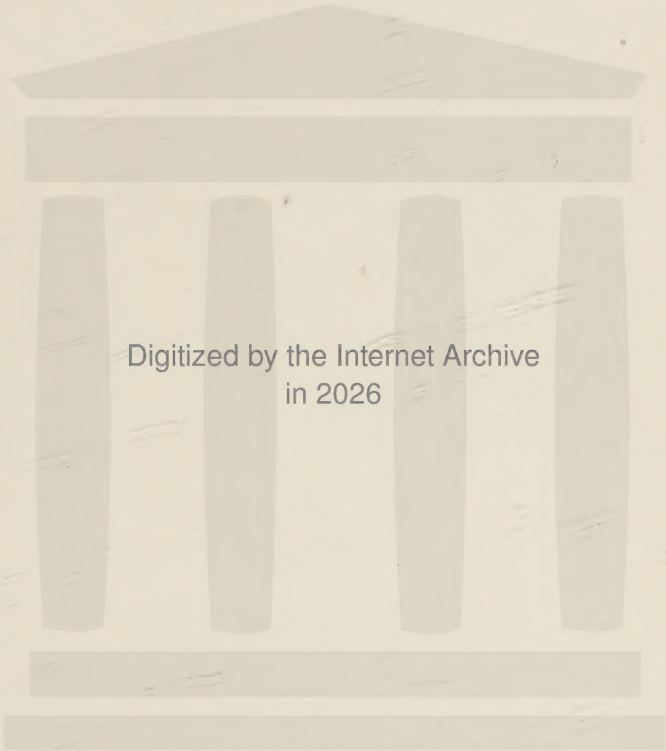
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Early British Bronze and Enamel Ornaments

From Polden Hill, Somerset

British Museum

IN SEARCH OF OUR ANCESTORS

AN ATTEMPT TO RETRACE MAN'S ORIGIN AND DEVELOPMENT FROM LATER AGES BACK TO THEIR BEGINNINGS

BY

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WITH A PREFACE BY THE

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PREFACE

MADEMOISELLE,

As I begin to write this preface to your new book, all those conversations which we had together when you were first planning it come back to my mind.

I suggested to you to try to give a history of events which instead of sliding down the thread of the past should climb up it, going, as each one of us does, from the known to the less known, and at length to that region attained only by scientific investigation. As the object was to discover the road followed by our species, why not treat the subject as an affair of family genealogy?

As children we first realized the near presence of our mother and father, and perhaps our grandparents, and for long our curiosity probed no farther into the problem of the origin of our family and our own lives. A little later the sight of a portrait or a miniature suggested the thought that our grandparents also had had a father and mother. We know hardly anything of these great-grandparents—at most where they lived and what were their occupations; of their psychology we are almost entirely ignorant. They are practically strangers to us. Our knowledge of them is often reduced to their mere names recorded in some legal document, or their signatures at the foot of some note yellow with age. Beyond this most of us know hardly anything. It may be that some sheaf of papers discovered at the bottom of a drawer which no one has opened, if we could decipher the scarcely legible arabesques, would tell us which of our great-great-grandparents were soldiers, agriculturists, or leather merchants, lawyers or vine-growers, that one inhabited a certain town, fought in such and such a campaign, received certain wounds, bought or sold such and such an estate.

We go back farther still? . . . You must then search

through old archives, and decipher with the help of expert palæographers, . . . a name followed by the indication of a domicile, a profession, . . . then the archives are mute, nothing more comes down to us from our ancestors, who are more and more numerous, and who prepared, some generations back, the outlines of our character and the basis of our fortune. Yet it is still their blood circulating in our veins ; it was their ingenuity which little by little built up those means thanks to which we live comfortably and have received a refined education. We have ceased to know them, and of them the only visible vestiges are ourselves, we whose faces show no doubt a likeness to some one of them.

Farther back our family history loses its individuality. The thread is infinitely spun out and lost in the inextricable tangle of the unknown generations of a province, a country, a civilization, a race, or even several or each of these divisions.

Few families, even ancient ones, can go back farther than several centuries ; sometimes they can trace one of their lines of ancestry to the Crusades, to the dawn of the Capet dynasty, to Charlemagne, if some marriage with a reigning family gives them the pride of a long line by blending their genealogy with that of the political history of a nation. But beyond that, even for them, charters are useless, the documentary silence becomes complete, individual history is blotted out in general history. If our ancestors of those days were free or bond, conquerors or conquered, kings or galley-slaves, heroes or criminals, we do not know—or rather there is no risk in thinking that some ancestor was one of these things, and that there are traces of all in the unknown ancestry of each one of us.

You said to me that that suggested to you the picture of those caverns from which issued a full-sized river, our life like the flowing water emerging into light from an immense black hole. By leaning forward a little one can see a few yards of the walls of the gallery of exit, quite distinctly near at hand, but soon confusedly, then only occasional projecting angles reflecting the light, till at last the darkness

covers all. Only by the light of lamps or torches can one penetrate the mystery and push forward into other galleries, which contract into narrow passages more difficult of access, till at the end one is brought to a halt by holes or fissures, at the foot of which the water is heard singing over pebbles, coming from a greater distance, the nameless collector of other inviolate rills fed by rain filtering through a thousand invisible cracks.

There, as in our subject, one cannot go backward very far in a direct line, and the subterranean " collecting cistern " is not unlike that crowd of unknown ancestors, always increasing the farther one moves backward, who prepared, long, long ago, our little lives.

What we say of this flowing river and of our private history one can also say of the history of nations, of races, of humanity, of the domination of different groups of living beings, of our planet, of our solar system. At a certain stage of this vista, a vista growing more and more immense, each of these histories becomes indistinct, merging into a wider whole. As our family history amalgamates at a given moment in its course with that of our nation or our race, so the history of these disappears in its turn in a wider history, and soon in prehistory of the entire human species.

This in turn is lost in the general mass of evolving mammals of Tertiary times, till only the vertebrates remain, . . . then evidence even of these soon fails us, and we are faced with the problem of the origin of the different types of living creatures. Geological archives do not allow us to go as far back as their origin ; their pages of limestone and schist, crushed and recast in the rocks of Archæan age, have become as indecipherable as the text of a book which has been pulped. Living creatures existed, that is all one can say, and before the more evolved living beings bacteria prepared through long ages their arrival, drawing subsistence from inert matter.

Then astronomical history is unrolled before our eyes, that of our globe, of our solar nebula, of our galaxy composed of millions of stars, in which the sun is only as a grain of sand, among millions of other star-galaxies separated

from ours by immense distances of space. . . . What a terrifying outlook, crushing for miserable pygmies such as we are! But what an uneasy satisfaction for the mind which dares to face it! However puny Man is, his spirit must be great indeed to measure such immensities, even to conceive them. And how shall he not recognize, when confronted with such an undreamt-of vision unveiled before his eyes, that as well as an active principle, self-conscious in that part of Man which is acted on by things, there presides in each one of us, on the side of the organically psychic evolution of the individual, an incomparably powerful first cause, which rules, co-ordinates, and unifies the immense system of spontaneous and intelligent energetic forces expanding at every instant in the immense Cosmos?

What a staggering reality this unity which causes each of the beings which constitute it, however distinct in themselves, to act and react ceaselessly one on the other through infinite space! For the Cosmos is no agglomeration of warring elements, strangers one to the other, but a complete organic unity. This unity of the world, this strict solidarity of all its constituent parts, is so commonplace and universal a truth, and so fundamental, that no one pays more attention to it than a little child pays to the air it breathes, because he does not consciously see or touch it. I am reminded of those poor natives of Tierra del Fuego who felt this truth, and to whom God is "He Who makes the world One." Truly the enormous increase of our scientific knowledge has perhaps deprived us of the perception of this fundamental reality, the root of everything, a perception which primitive people have kept. "The mole-hill hides from us the mountain." In our days only the mystics have preserved and rediscovered this vision, that St Paul formulated in his "In Him we live, and move, and have our being."

But if this first and intimate cause of all activity, of all being, of all expansion in the Cosmos, lives (although one forgets it) at the source, alike the centre and summit of all life and all action, unalterable and resplendent to the spirit of Man, once he is capable of contemplating it, it is not less true that the advances that the spirit of Man has made in

the last decades are astounding, in his efforts to penetrate not only the intimate structure of things, but their history, and make them accessible to control, and capable of expression and transmission. This is the fruit of scientific effort applied to the aspect of things and beings that one can discern or deduct by observation, but could not reach if it were not for philosophy proceeding by other routes to the unseen things hidden behind the obvious.

Applied to the history of things in time the scientific method is essentially expressed by this axiom : *Every being, every thing, every institution, derives, at least in greater part, from its antecedents, and is in its turn, at least in greater part, the starting-point of the realities which follow it.* This axiom, which I stated a few months before his death to the much-regretted Cardinal Mercier, was recognized immediately by him as an essential trait of the fundamental scientific method ; that is to say, it is not an *hypothesis*, but a *way of knowledge*, a method of discovery. Now this principle, *the very base of the idea of Evolution, the inevitable starting-point of all knowledge of facts and of realities succeeding each other in a given time*, is a principle which postulates in itself no philosophical theory on the ontology of beings. Yet philosophy, even if imperfectly, can use the fruits of those discoveries for its own inferences.

But these evolutionary vistas do not provide directly any reason for the philosopher to be a materialist or a spiritualist, a believer or an atheist ; he will be that for other reasons which are not in the realm of objective science (that is to say, of beings considered from without as objects).

Though the evolutionary method is a marvellous instrument of knowledge and discovery, it would be a great delusion to see in it a *cause* of the development of beings. A principle of discovery, a method, is not an ontological cause. Certainly some scientists and also their opponents have not made this distinction. Evolution does not give the basic reason for any transformation, but by its point of view alone one can guess, more or less imperfectly, at the succession of past realities and their genealogical development.

It is the fashion to speak nowadays of the failure of Evolution, which shows another confusion of ideas. The attempts at mechanistic explanations which have been tried by certain notable minds, interesting in some ways, though seriously insufficient to explain the whole, and even the principal facts, have all ended in bankruptcy as regards the providing of a complete explanation.

On the other hand, the genealogy of living creatures, constructed at first in a simplified and rather *naïve* manner, had confused various convergences in the adaptation of organs for special functions in the various groups with such traits as were really related.

That was the result of a science newly born and feeling its way. Even presented thus, out of date as it appears to-day, the synthetic point of view obtained gives a certain idea of what has passed, a more exact idea than no view.

The genealogical trees which with infinitely more documents and experience we trace to-day are much more complex, delicate, and better founded. While in part they will doubtless remain unchallenged, some portions will be revised, but the vision that books such as those of H. F. Osborn, for instance, give us of the living world of the past will always remain a magnificent synthesis, as exact as is possible in the present state of our knowledge, and marking a glorious stage in our realization of the Actual in past ages.

Whatever one does, and whatever one says, one can never try to understand something of the order of succession of facts, things, beings, or institutions unless by applying this marvellous principle of knowledge known as the Evolutionary Method.

And if, as I hope, reading your book will make those who open it feel something of these problems, forcing them for some minutes to contemplate this vast point of view, the existence of which hardly occurs to many people, I believe your book will have filled its *rôle*, which is in face of facts to oblige people to withdraw into themselves and to think.

H. BREUIL

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M. E. B.

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CHRONOLOGICAL TABLE

IRON AGE

La Tène Period	
III	Christian era to 100 B.C.
II	100 to 300 B.C.
I	300 to 500 B.C.

(Fall of Bibracte, 5 B.C.; fall of Alesia, 52 B.C.; sack of Rome, 390 B.C.)

Hallstatt Period	
II	500 to 700 B.C.
I	700 to 900 B.C.

(No Hallstatt culture is found in Britain or Western Gaul, which seem to have passed from the Bronze Age civilization to the La Tène period of development.)

BRONZE AGE

Period	
IV	900 to 1300 B.C.
III	1300 to 1600 B.C.
II and I	1600 to 2000 B.C.

(Introduction of bronze and copper into Europe about 2000 B.C.)

COPPER AGE

2000 to 2500 B.C.

(In Italy and the Celtic kingdoms at the end of the Neolithic civilization.)

NEOLITHIC AGE

About 8000 B.C., but varying greatly in different lands and civilizations.

AZILIO-TARDENOISEAN AGE

About 10,000 B.C.

MAGDALENIAN AND SOLUTREAN AGES

About 10,000 to 18,000 B.C.

AURIGNACIAN AGE

About 18,000 to 25,000 B.C.

MOUSTERIAN AGE

25,000 to 50,000 B.C., or longer.

ACHEULEAN-CHELLEAN AGE

Date uncertain.

GEOLOGICAL

QUATERNARY AGE

Still existing.

TERTIARY AGE

Pliocene, Miocene, Oligocene, Eocene

Reign of mammals.

SECONDARY AGE

Cretaceous, Jurassic, Triassic

Reign of reptiles.

PRIMARY AGE

Permian, Carboniferous, Devonian, Silurian, Cambrian, Algonkian, Archæan

IN SEARCH OF OUR ANCESTORS

INTRODUCTORY

The Romans threw us a road—a road
And sighed and strolled away.
G. K. CHESTERTON

THE most socialistic institutions of a country are the roads ; and this is a very good example of how far human inventions travel from their original purpose. In the case of Western Europe the Romans were the chief road-makers, and the results of their labours, designed to facilitate the advance of their triumphant legions in the conquest of those Celtic peoples whose restless genius was already threatening Imperial supremacy, now re-echo to the thunder of modern traffic and the greater armed hosts of a so-called " more civilized age." Those roads which scarred the marks of Rome's power across a conquered country remain to benefit the once subject people long after Roman dominion has become a past dream.

The roads are the servants of the people, and are worn with use or grass-grown according to the trend of the national fortunes to one or other point of the compass ; but the great main Western European arteries, being determined by geographical eccentricities, alter but little. Trade-routes existed before the days of Rome's power—the oldest European one passed by the Straits of Gibraltar. The road of to-day, choosing an easier level, or demanding a greater width, drops or rises for a time above the Via Aurelia of the Romans, leading from Rome along the Italian and French Rivieras into the heart of Gaul and on toward the misty isle of Britain in the Northern seas. The eyes of tourists of the twentieth century look with interest at the few yards left here and there of the old paving, and wonder what chariots of war

or carts laden with booty left those scars on the marble flags.

A charming, though perhaps unscientific, belief still lingers in Southern Europe that when the migratory birds arrive from Africa in the spring they follow the old Roman roads on their journey northward, being ruled still by the experience of the birds of past centuries who found in the passage of armies plenty of food.

When our minds go back to those days in which the proverb " All roads lead to Rome " was not a mere popular saying, but a fact, we at once begin to try, like the birds, to follow in the ways of our ancestors. Our thoughts plunge into the forests and mountains, leaving roads and consecutive history behind us. The tramp of the legions grows fainter ; the baths, the villas, the sections of Roman pavement, all the vestiges which remain to us of the invading hosts, lose their interest, and we ask to be told of the people whose eyes watched the Romans pass, of their smiths who in the depths of their forests forged the iron swords, the admiration of their temporary conquerors, of those chiefs who lie buried with their panoply of war around them. What was their religion ? What fanned their great passion for art, shown in the fine workmanship of iron and other metals ? How was born that Celtic imagination which is responsible for the great palace of dream, legend, and faerie which constitutes the literature of North-western Europe—a palace still lit from time to time by fresh Celtic fire ?

As children, when we listened to the story-teller's art we asked breathlessly, " What came next ? " When a nation or a person is fully grown the question asked is, " What came before ? Before us—who ? Which way did we come ? " An occasional wistful glance may be cast into the future, but we know the future is not our realm ; it is the land of speculation, the country of youth. " Where are we going to ? " is a question inclining the middle-aged to pessimism, but " From where did we come ? " sounds a clarion call to experience, to enthusiastic investigation, to harnessed imagination. Let us take possession of the roads of our country in imagination as we do in everyday life, and travel them slowly, looking

to right and left, listening to the calls from the forests, gazing at the mountains and rivers, inquiring about the monuments left by forgotten peoples, watching the animals, and not despising the very stones under our feet or the dust blowing in our faces, for in the least expected places a clear voice will be heard calling " By this way you came ; so did you learn ; behold and salute the Genius of your race ! "

The longer we travel the more entrancing will be the journey, centuries will fall behind us like autumn leaves, time will lose its significance, nationality will have no meaning, the absorbing epic of humanity will unfold, until we stand in a universe beyond the dreams and genius of any single race, and look outward over the ocean of the unknown.

CHAPTER I

LA TÈNE III

All we have of Freedom, all we use or know—
This our fathers bought for us long and long ago.
RUDYARD KIPLING

BEING human, we must start from a definite point on our explorations. Commerce always follows on the heels of an army; the merchants may have fled before the tramp of the soldiers, but the thunder of war has not passed before they are there again, keeping open the road made for sterner uses. These very roads were often constructed on top of the old paths worn by the feet of more peaceful travellers. Tacitus reproached the Roman merchants who established themselves in Bohemia at the beginning of the Christian era with love of gain and lack of patriotism. They ran great risks, these merchant-adventurers, for, following the armies of Cæsar in Gaul, they were massacred at Orléans, at Nevers, and at Châlons-sur-Saône in the days of Vercingetorix. They practically captured the markets in Gaul, and became necessary as middlemen in all commercial transactions. They brought with them all the products of the South, and chose the valley of the Rhône as their principal highway northward.

This period in history is known as the Iron Age, on account of the important part that metal played in the life and art of the people. For purposes of simplification the age is divided into two epochs, Hallstatt and La Tène, called after the settlements found at these two places. The La Tène epoch is subdivided into three periods, all named La Tène after the type-station, originally covered by the waters of the Lake of Neuchâtel. The water-level was lowered by engineering works, and the uncovered site yielded a great number of arms and other objects of later Iron civilization.

The two divisions known as the La Tène and Hallstatt

periods apply only to Central and part of Western Europe. In Britain, as in Brittany, there was no Hallstatt culture ; except for a few bronze swords of Hallstatt type the Iron Age began in these regions with the La Tène era ; and in Greece, which was equally isolated from the centre of this Celtic civilization, the last thousand years before the Christian era are divided into stages named from the various fashions in art, till, in 145 B.C., Greece was conquered and the Roman domination began.

The whole period of the Iron Age in Western Europe extended for about 900 years, of which the La Tène division occupied 500 years. Going backward, we find

La Tène III . . .	Christian era to 100 B.C.
La Tène II . . .	100 to 300 B.C.
La Tène I . . .	300 to 500 B.C.

These dates apply to the districts at the heart of the Celtic civilization ; to remote countries changes in culture came slowly, or came not at all.

When we try to picture the life of the late Iron Ages we have to turn to the camps and the tombs for information. The centre of La Tène culture lay between the Rhine and the Danube, the Seine and the Saône ; these four rivers formed the eastern and western boundaries, but from this centre the civilization spread in many directions.

In the La Tène III period cremation was the most popular method of burial, though there are examples of inhumation. Burials of this age in Southern Germany in nearly all cases show the body burnt. At Aylesford, in Kent, pottery vessels were found in pits, about a yard deep, which contained human bones and ashes. Britain, being so far removed from the centre of this civilization, was later in adopting changes of rite and culture, so that some specialists have been inclined to classify the discoveries there under an additional stage, La Tène IV, coinciding in part with the Roman occupation.

In France the sepulchres of the third La Tène period show very few treasures. The habit of cremation precluded the elaborate funereal trappings of an earlier day, when the body was laid unburnt in a setting fitted to the rank and wealth

of the deceased. With the ashes and burnt bones of the corpse, either enclosed in a pottery jar or scattered on the earth, coins and jars of food and objects of personal adornment are sometimes found, the latter having often passed through the fire too. There are seldom swords and lances as in earlier times, and any arms which have been found are twisted and bent, according to a fairly usual custom of making the dead person's possessions useless. In a burial at Cernay-les-Reims there were two vases, both broken ; one contained ashes and burnt bones, the other a little human head in bronze, five Gallic coins, and fragments of bronze and iron.

Occasionally during this third La Tène period the dead seem to have been burnt on top of a burial mound, as at Celles, in Auvergne. The habit of using amphoræ to contain the ashes was fairly frequent at this date. The necks of these jars were broken to enlarge the mouth, and the number of these vessels may testify to the love of the Gauls for wine, which they did not as yet manufacture, but which they imported from the other side of the Alps. The custom of burial in amphoræ was frequent in Cisalpine Gaul ; and in Portugal during the Roman period memorial tablets have sometimes on them a carving of a barrel, the successor of the Southern amphora as a wine-holding receptacle.

The Germans had the habit of cremation before the Celtic peoples, but in the days of the La Tène III culture it was almost universal in both races.

In Scandinavia it was more usual to burn the bodies in the open and leave the ashes, so that excavators find a thick deposit of black dust, with fragments of charred wood. Sometimes a mound was raised over these remains ; in other instances the tombs are flat. Fibulæ, iron or bronze brooches of La Tène III design, are often found in the ashes. The variation of pattern in these brooches provides one of the chief means of dating the different periods. Though isolated districts like the High Alps developed local varieties in these brooches—such as a circle with a pin crossing the centre and without a spring (a type which still exists in the modern Celtic art of the Hebrides)—still, there was a great similarity in these articles in the different periods.

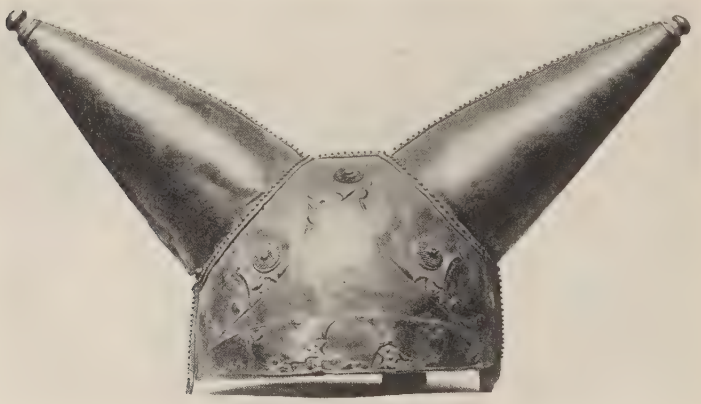
The La Tène III culture extended as far as Southern Russia, for in a necropolis on the banks of the Dnieper, in the province of Kief, various fibulæ of this age were found.

In Cisalpine Gaul the Roman influence affected the steady development of the weaker La Tène III civilization, and the Celts, beguiled by the beauties of the art of Etruria and Greece, lost some of their artistic individuality, but in Great Britain, in Scotland and Ireland as well as in England, the British artificers continued to produce arms of incomparable workmanship. Two shields of this third period are in the British Museum; they are shaped in the form of an ellipse. One is ornamented with coral, and has a metal *appliqué* of a wild boar. This one was found in the river Witham. The wild boar was a tribal sign, an idea which later developed into the heraldic insignia of the Middle Ages. It was considered as a sacred animal by other peoples not of Celtic origin, was carried before hosts in battle, represented on coins and medals worn as mascots, and even crowned the helmets of warriors. The second shield has twenty-seven buttons of red enamel attached by rivets, and shows fine metal *appliqué* work. No shields equal to these in richness of ornament have been found in other countries. Search in the river Witham also produced an interesting dagger, now in the Guildhall Museum, London. The handle represents a human figure standing. Ten daggers in all have been found with handles representing human heads, three of them in Great Britain, but the one from the Witham is the only example of a standing human figure forming the handle.

Shield with Twenty-seven Buttons of Red Enamel

A very interesting bronze horned helmet found in the bed

of the Thames is now preserved in the British Museum. Though made in the style of an earlier age as regards workmanship, being several plates of bronze hammered and secured by rivets, it yet bears faint traces of a thin coat of enamel of La Tène technique, giving another instance of the slowness of penetration in Britain of Continental culture influences. The Gauls as a rule fought bareheaded, the helmet being reserved for men of rank, and being always more popular in Italy than in France. The very few



A Horned Helmet

helmets which have been found north of the Alps with remains of this period are of iron, and are more like the Roman model.

The sword was for long the principal weapon of the Celts, and their smiths were renowned for manufacture of this arm. The warriors wore them on the right side, attached by a belt of metal or leather. Each period of the Iron Age displayed a different decoration and slight modification of form, which makes them useful in determining the chronology of deposits. Tacitus speaks of the long, pointless blades of the Britons, a type found in Cumberland in the third La Tène deposits, the pommel and scabbard of which have red enamel ornamentation. In Germany the swords, though decorated with a sort of damascene work, are far inferior to those found in the

heart of Gaul, and especially to the British ones of this later period, which were triumphs of the smith's art. In Denmark and Sweden swords of this age were often sharpened only on one side.

In France the principal fortified town of this date was Bibracte, on Mont-Beuvray, 27 kilometres from the modern Autun. At the time that Napoleon III was writing his history of Julius Cæsar the site was excavated at his expense by M. Bulliot, and since then it has been popularly called the Pompeii of Gaul. The foundations of the houses were in a

Bronze Vase found at Alesia

good state of preservation under the surface soil which had gradually collected since the inhabitants were driven out by order of Augustus and forced to found the present city of Autun in the plain. All the objects found in the excavations belong to the La Tène III period, the time of Bibracte's glory. The houses were built of loose stones cemented with clay, or of wood, and were half below ground, a method, no doubt, of making them more sheltered in winter storms. The majority had only one room, especially in the quarter devoted to smiths and traders. In the richer quarter the houses were bigger, and one boasted thirty rooms, set in the Roman way round a central court. The inhabitants evidently knew the Roman method of heating houses and baths, another sign that they took from the Southern civilizations anything they

admired. Most of the floors were of pounded clay, and the roofs were probably thatched, though fragments of Roman tiles for both floors and roofs were found.

Bibracte was a great trade-centre ; coins of all sorts, in gold, silver, and bronze, from different nations, were found in all the houses. Metal-work, enamels, and ornaments were the work of the townsfolk ; pottery jars with geometric designs and clay ram's horns for supporting logs on the

Silver Cup, known as "Cæsar's Cup," dug up at Alesia

hearth, though not made in the town, came no doubt from the neighbouring districts. No coins are more modern than five or six years before the Christian era, which points clearly to the date of the abandonment of the city. The inhabitants, having time to evacuate it, took their treasures with them, a fact which accounts for the small number of objects found. In spite of this forced exodus an annual fair continued to be held near a little temple in what was once the Forum, for coins both Gaulish and Roman, the latter of the date of Valentinian, have been found there, and the fair of Mont-Beuvray was known through all France in the Middle Ages, and may have been a survival of this earlier yearly pilgrimage to an old home.

Alesia, besieged by the Romans fifty-two years before the birth of Christ, and the scene of the last heroic stand of the Gauls under Vercingetorix, is on the modern Mont-Auxois. It was also a notable city, and the street which crossed it from east to west shows the two deep parallel ruts seen on the Pompeian streets, serving the same use as our tram-lines —to ease the passage of vehicles. The finds in Alesia were very similar to those of Bibracte.

Wooden Bucket with Iron Bands, found at Alesia

There are similar armed camps, which were also towns, in England, such as at Hunsbury, near Northampton. Instead of the many coins of the centres in Gaul, bars of iron were found which had a commercial value, and seem to have been much used in place of coin. The lake-village of Glastonbury in the West of England, which was built in a marsh on an artificial island, and was protected by a palisade, produced very few weapons when it was examined, but was rich in utensils of this age. The same incised pottery, brooches, weaver's combs, glass and amber beads, wooden bowls, and a strange table cut out of a tree-trunk were all found here.

Habitations in Scotland of this civilization seem to have been used more for refuge than to house trading communities. Round towers built of dry stones, of which only ruins remain, are now known as 'brochs.' The door was the only opening in the outer wall, all the windows looked into the court, and as the walls were enormously thick defence was easy. The

broch of Mousa in Shetland is still forty-five feet high, and one can trace six galleries above the ground-floor rooms. Records of it reach back a thousand years, when a saga relates that it was a refuge for a whole winter of Bjorn Brynjulfson and his bride, shipwrecked on their flight from Norway. Other brochs exist in Orkney, the Hebrides, and Caithness. Rather similar fortified dwellings are found in the Balearic Islands and Sardinia. In Sardinia these buildings may have been constructed in the Bronze Age, but in Scotland they belong to the Celto-Roman era. The underground houses called ' weems ' in Scotland, built of dry stone with flagged roof, may have been Celtic also.

The richest of all the stations of this age is that of Stradonitz in Bohemia. The city, defended by a stone wall, was as large as Bibracte, and there was evidently a well-marked trade-route across Switzerland from one centre to the other. Stradonitz had originally a Celtic population, driven out by invading Germans at a date rather previous to the forced exòdus from Bibracte ; quantities of gold coins were found on the site of the city, and among a mass of arms and utensils of the third La Tène type a quaint little man in bronze blowing a trumpet and a dagger with a man's head for handle.

Julius Cæsar was appointed governor of Gaul in 59 B.C., and in his *Commentaries* descriptions of the construction of the dry stone walls round the Celtic camps are given. They were strengthened by beams and bars of iron, and in some cases the remains of the defences are vitrified. This may have been in some battle conflagration or have been done purposely to blend the whole into a hardened mass.

It must always be remembered that this dividing of the different ages into periods is apt to be misleading. For instance, the La Tène III civilization when at its height in Central Gaul had hardly reached Britain, and continued in that island long after Bibracte and Alesia were deserted. Then the artistic influence brought by traders from Etruria and Greece which so much affected the art of the central Celtic peoples had mostly a Continental expansion, so that in some remote districts the great change in taste which

distinguished the various periods is not emphasized, and therefore not so helpful to chronology.

M. Salomon Reinach in his book *La Sculpture avant les influences gréco-romaines* says, " If classic art were to fall into oblivion to-morrow, it is the style of La Tène which would take its place as a spontaneous product of the national temperament, that does not change any more than the character of the individual changes."

When we turn to consider the religion of the Celtic people at this time we have no very clear records to go on. Strangely little is known of the cult of the Druids. This is partly because it was against their code to write any of their statutes, the initiates being forced to learn them by heart, and also because they did not worship idols, their gods were not men, so that there is a scarcity of statues in the Celtic regions. They seem to have adored the sun and moon, the spirits of rivers, fountains, and trees, to have worn a great many mascots, to have used clairvoyance and magic to predict future events, and to have had a firm belief in lucky numbers, chiefly in the number three and its multiples. This belief the Druids are reported to have learned from the disciples of Pythagoras. If this is true it shows that Grecian influence was not confined to the pottery, the wine, and the artistic taste of our ancestors, but permeated the whole racial development by way of their religion.

The Druids were exempt from war-service and taxes, and were divided into three classes, the Druids, or priests, the Vates, or sacrificers, and the Bards. They taught the transmigration of souls into both animal and human shapes. In times of great stress they used human sacrifice, choosing a criminal as victim if possible, as being more pleasing to the gods, but if none was handy a captive or slave, or anyone equally defenceless, did as well. To defy the orders of the Druids was a dangerous thing; the offender was excommunicated, and his neighbours spoke or had dealings with him at their peril. The curse on his head might be deflected to theirs. Some fire-worship seems to have mingled with other strains in the Druidic faith. It is probable that the elements, earth, air, fire, and water, were worshipped, as well

as the heavenly bodies. On the 1st of May fire and water were consecrated by the priest, and in Ireland all fires had to be extinguished on the eve of Bealtinne (May 1), it being unlawful to relight them before the Druids had relit theirs on the hill of Tara. One wonders if the uncomfortable habit which existed until the last fifty years of suppressing the household fires except in the kitchen from May 1, regardless of the vagaries of a Northern European climate, had its root in superstition rather than in a Spartan contempt of luxury.

The number of holy wells which existed almost until the present day points to the sacred qualities of water in the Celtic mind.

The best picture of the life at this time may be gathered from the Irish sagas. The heroes described wear the dress and armour of the La Tène period, and in the cycle about Cuchulain, the Irish Achilles, they fight in chariots, have war-dogs, and cut off the heads of the vanquished and sling them round the necks of their horses. The greatest Irish epic is the story of a cattle-raid and the description of two wonderful fairy bulls, supernatural beings reborn as bulls, who had in turn been ravens, warriors, sea-monsters, insects, and swineherds belonging to the fairy folk. These tales kept alive to some extent the Druid beliefs, especially in the transmigration of souls, even after Christianity had ousted the old faith. When the Druids were suppressed there remained the "fili," or "those who saw." They used divination, were story-tellers, lawyers, judges, and poets. Their training lasted twelve years; legend, history, law, grammar, topography, metre, and writing were the subjects studied. There were ten degrees of filid, ranging from he who knew 350 stories, called an "ollam," to the "oblaire," who knew seven. The Romans never invaded Ireland, which has always been a pastoral country, so cattle and not coin were the currency, and though the actual date at which the Cuchulain heroes were supposed to have lived was the first century of the Christian era Ireland from its isolated position kept the habits and customs of an earlier age. The descriptions of the earliest invaders of Ireland tell of fair-haired, grey-eyed men, armed and dressed as Gauls, who came from the Continent.

Coral and amber, which came from the Mediterranean, were prized not only on account of their colour, but because they were supposed to bring luck and avert the evil eye. Coral, once believed to represent the blood flowing from the Medusa's head, was very popular for the decoration of arms, and when the supply of coral ran short red enamel took its place. Amber was supposed to have healing properties, and was specially worn by young girls.

The custom of pouring human blood on the earth so that the foundations of a building might stand firm, a custom not confined to any one race, has still a faint echo in the burial of coins of the day below a foundation-stone, and was followed by the idea of propitiating the earth-goddess for disturbing her ; it may have accounted for some of the traditions of human sacrifice associated with the so-called Druidic temples and sacrificial stones. The fact that the pottery supports for logs on the hearth made in the La Tène III period in Gaul were in the majority of cases ornamented with a ram's head, whereas in earlier days a living ram was sacrificed for the purification of the domestic hearth, shows that savage practices were giving way to symbolic rites. The metal supports for the same purpose found north of the Alps have a bullock's head instead of a ram's.

This third period of La Tène was one of decline in the Celtic power. The Roman influence began to spread over Europe, and the great Celtic kingdom, or rather series of kingdoms, which stretched over Spain, Gaul, Britain, and Northern Italy, which reached the shores of the Black Sea, and even extended into Thrace and the centre of Asia Minor, fell gradually under Roman domination. For eight years Gaul struggled against the Roman legions, only to fall, weakened as she was with fifty years of fighting against the Cimbric-Teutonic invasion, successive waves of barbarians wasting the country they overran.

Let us step backward into the second division of the La Tène civilization, between 100–300 B.C., when we shall reach the threshold of those times when Rome herself quailed before the onslaughts of these restless folk.

CHAPTER II

LA TÈNE II

Here's a world of pomp and state
Buried in dust.

FRANCIS BEAUMONT

THE various divisions of the Iron Age are marked by no very definite line ; no cataclysm separates one from the other ; it is more a case of general expansion and gradual decline. The changes in the workmanship of arms and utensils and in their distribution trace for us this development. A good parallel in historical times of these divisions of ages is the change of style in furniture. The so-called Louis XIV, Louis XV, Jacobean, or other well-known styles did not cease with the end of the reign which inspired them ; the greatest number of examples are found in the country of origin, but from the original centre the different styles were carried and copied more or less efficiently all over the world, until the copyists grew careless, the style deteriorated, public taste revolted, and another fine craftsman launched a new style on the world. Galatia seems to be the only country with a Celtic population where no traces of La Tène civilization are found, and this is accounted for by the great distance from the chief Celtic cities and the fact that Greek culture penetrated there in the early Iron Ages, so that there was no transition period. It may also be that the researches carried out have not been sufficiently extensive.

About the beginning of the second La Tène period the Celts copied their neighbours of Italy and Greece and introduced a coinage, in both gold and silver, which gradually superseded the archaic system of trading by exchange.

Although traders passed continually between Brittany and Britain through both Bronze and Iron Ages, no objects of earlier manufacture than the second La Tène period are

found in the latter. The earliest metal vases coming from Southern Europe are found in the burials at Aylesford in Kent. This emphasizes the fact that it was the art of Greece and Italy which was the parent of the La Tène development. In the course of their raids into the Southern lands the Celts bore off with them whatever works of art took their fancy, and they had an instinctive admiration for beauty of form. They are said to have stolen from the temple of Delphi the sacred vases, and to have been prevented from carrying them off only by an earthquake which hurled down rocks on their heads.

Etruscan vases attracted their admiration. In the year 100 B.C. the kingdom of Etruria was bounded by the Arno, Apennines, and Tiber, and by means of their fleet the Etruscans had complete control of commerce in the Tyrrhenian Sea, made a treaty with Carthage, held Corsica, and ruled as far as Spain. This maritime supremacy accounts for the great Grecian and Egyptian influence shown in the art of a nation which had originated centuries before in a Lydian migration into Italy.

The treasures found in the graves of Gaulish chiefs were thought to have been always booty of war. It is more probable that the greater number of vases found in graves were brought by the Celtic merchants sure of a market for their importations. In the tombs of Central and Southern Gaul no ceramic vases of this age have been found. The pottery of the day was greyish yellow, sometimes ornamented with lines, except in Spain and South Europe, where reddish vases are found, some with traces of dark varnish on them.

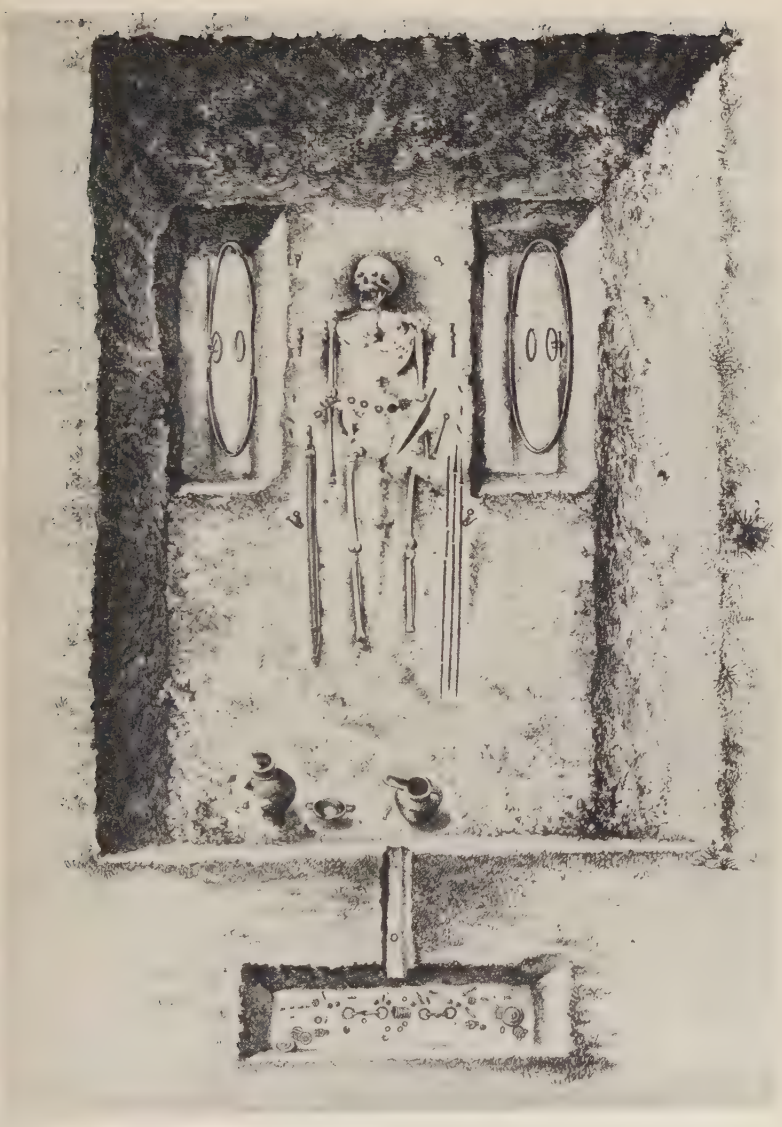
During the construction of a canal in the commune of Mœuvres, a ditch containing about two hundred skeletons was laid bare. All of these were headless, and as it was the custom of the Gauls to behead their defeated enemies it looks as if these corpses had been hurriedly buried after a victory. Unlike the heroes of the Irish sagas, who are said to have cut off the heads of their enemies and to have slung them round their horses' necks, the Gauls, we are told, nailed the heads of their defeated foes on their houses, a custom which has still a faint echo in the placing of large stone balls to

crown the gateposts of an entrance into private property. In the ditch at Mœuvres swords, lance-heads, and brooches of this period, and a few beads of necklaces, had been tossed in beside the headless bodies.

In the commune of Guillestre, in the department Hautes-Alpes, the skeleton of a woman was found laid in a grave edged with piled stones. She wore a necklace made of nine amber, eleven bronze, and seventeen glass beads, and had a passion for bracelets, for twenty-six were on her right arm and eight on her left. She was evidently buried in a long garment, for forty-six bronze buttons lay in line reaching to her feet. Four or five brooches completed her store of jewellery, one of them being of a type confined to the Alpine districts and two typical of La Tène II.

The custom of surrounding the dead with valuable possessions was given a great impetus in the Celtic mind by their traffic with the Etruscans. Etruria lay half-way between the markets of the world, and to its principal towns came the merchants of the South and East carrying gold, ivory, and jade, and those of the North and West bringing tin, amber, and iron. The Greeks brought vases which the Etruscans copied, and which found ready purchasers in the Celtic peoples, with their instinctive love of design and form. The great luxury of the Etruscans attracted the Celts, who have an inherent love of display, and they brought back beautiful vases from their trading expeditions, and enriched their dwellings and tombs. It is this influence which led to the so-called chariot-burials, in which the warrior is buried with his chariot, lance, sword, and javelin, the harness, and occasionally even the horses. In some cases there is a helmet, which was worn only by people of high rank, and a gold ring or bracelet. These chariot-burials were most frequent in the early La Tène days, fairly usual in the middle stage of the period, and had given way to cremation in the latest phase, when the great days of the transalpine trade were over.

The department of Marne in France contains fifty known examples of these chariot-burials. As well as the complete equipment of a warrior, cups, plates, jars for holding liquid, and even great stores of food were buried, and we get a hint



A Chariot-burial at Somme-Bionne

of the dead man's favourite dishes, for in a grave at Châlons, besides ducks, hares, and pigeons, there was a dish of frogs and a whole wild boar. The food was often packed in jars, fragments of charred wood placed near the skeleton, and a shallow ditch dug all round the buried objects. In earlier days a rough stone wall was built round a burial, and this ditch seems to have succeeded the wall, but was so shallow that it must have been more for magical than actual protection. Cæsar records the magnificence of the Gallic obsequies, and says that when cremation was in force, as in the third La Tène period, favourite slaves were burnt with the dead. In many cases beside the warrior lies a woman's skeleton, which bears out the tradition that the Celtic women were either killed or committed suicide on their lord's death. Their belief in a future life led them to try to ensure that all the deceased hero loved in this life should be reborn with him in his future existence. The richness of the burials naturally varies according to the wealth of the tribes living in the district, and is most profuse where traders were most active. Amber beads instead of golden torques round the neck, a sword ceremonially bent or broken instead of the chariot of war and trappings, are found in the poorer districts.

The finest swords of this age seem to have been made on the Danube and the Rhine, and had beautifully decorated scabbards.

It was the invention of iron weapons which made the Celtic peoples invincible. In the valley of the Danube and those of the Alps, where tribes of this race had dwelt since the Stone Age, they discovered the art of smelting iron, having already worked in bronze and copper.

It was about 280 B.C. that the Celts, having collected a great army at the head of the Adriatic, defeated the Macedonians, overran Thessaly, and, descending on the celebrated shrine of Apollo at Delphi, tried to carry away the treasure, only to be driven back in 279 B.C. by the Ætolians. Intent on conquest, they crossed the Hellespont, invaded Asia Minor, and struck such terror that even the kings of Syria paid them tribute and the coast of the Hellespont was given up to them. They were finally defeated by Attila, King of

Pergamum, and confined to Galatia. Attila erected a votive monument on the Acropolis at Athens, which gives a fine idea of the Gaulish warrior; statues from this work of art are to be found in the museums of Naples, Venice, and the Louvre. Another band of Celts crossed the Danube, invaded Russia, and mingled with the Scythians.

The Celtic peoples, like other primitive warrior races, made much noise when they fought, their war-cries mingling with the clamour of trumpets and blows of lances on shields. Examples of their trumpets and of lances, shields, and other

VASE FROM THE LAKE OF BOURGET, WITH APPLIQUÉ OF TIN—HALLSTATT AGE

arms are to be seen on the triumphal monuments, still standing, which in imitation of the Greek habit they in later days erected to commemorate their victories. Their war-chariots were highly ornamented with enamels and metal *appliqué* work, and were painted in brilliant colours. The industry of chariot-making must have been a great one, for it is reported that at the battle of Sentinum in 295 B.C. there were a thousand war-chariots. The warrior fought from his chariot, hurling lances and javelins and shooting arrows. He was sometimes accompanied by a charioteer, but was often alone, and drove into the enemy host, when the careering horses and the great noise made by the iron wheels struck terror into the foe. Having exhausted his store of missiles, the warrior drove into the thick of the combat, where with sword and shield he fought on foot. The charioteers then

gradually withdrew the chariots from the *mêlée*, and formed a defence toward which the combatants could retire if hard pressed. Cæsar mentions the fine driving of the British charioteers; the only people comparable to them in the manipulation of war-chariots seem to have been the Persians, who had scythes attached to their wheels, a fashion the British are said to have followed, though no remains of such an equipment have been found with the chariots excavated in Britain.

In some Gaulish tribes it was the custom to fight naked, and these tribes were often used as storm troops, and went first into battle. In early days the Celtic tribes at some distance from the Gaulish centres of their civilization merely painted themselves with dyes obtained from various plants. Women and girls are reported to have dyed their skins black for certain religious ceremonies; and the British tattooed themselves in blue. When the Gaulish civilization evolved a national dress the men wore trousers, which they are thought to have copied from the Scythians, a short tunic with long sleeves, and a cloak pinned on their shoulders, all garments being dyed in checks or stripes of many colours. From earliest times they had a great love of jewellery, both men and women wearing many gold ornaments, the most distinctive of which was the torque, a golden or bronze collar. This seems originally to have been a feminine ornament, but from the time of 300 B.C. onward it appears to have become a masculine decoration. Gold was not so plentiful in the middle of the La Tène period as it was in earlier days, and few golden objects are found of this date.

A Torque

Bronze bracelets, and in a few cases bronze ankle-rings, were found in burials of women and children. The brace-

lets had great variety of design and were very popular; more than a hundred thin bronze ones were found on a skeleton at Saint-Jean-de-Belleville. Bracelets of lignite, a sort of fossilized wood, are found mostly in burials of the middle La Tène period, and this fashion was widespread, being known in Gaul, Bohemia, Switzerland, and Alsace.

One of the principal possessions of the women of this age was a metal girdle. These girdles were made in a mould, not hammered by hand, and were ornamented with enamel pendants in the form of amulets and a fastening often in the shape of an animal's head. They passed round the waist, and an extra length of chain looped across the front, from which the pendant amulets hung down, was fastened at the side. Women's clothes were fastened by bronze or iron brooches on the shoulders, brooches of greatly varied design, the catch resembling a safety-pin. Often the two shoulder brooches were connected by a slender chain of bronze. Celtic jewellery had already passed its heyday, and the richer, more elaborate, brooches belong to an earlier time. Rings were very popular; one woman was buried wearing a silver ring on her thumb, and three rings, one of silver, one of gold, and one of electrum, on her third finger. The art of filigree was copied from the Etruscans, and used in making rings and earrings. The Swiss women of these days seem to have possessed the greatest number of rings, and to this period belongs the gold coin found between the teeth of a skeleton in the necropolis of Langdorf. This custom recalls the fee to Charon for crossing the Styx, and was perhaps imported from Greece, or, more strictly speaking, revived by Grecian influence, for we shall find a similar custom in much earlier days. There must have been a good deal of refinement and interest in toilette in these days, for many tombs contain little utensils such as are in modern manicure sets and small perforated spoons, perhaps used in the preparation of cosmetics.

Iron razors and scissors in the shape of modern sheep-shears are found in men's tombs. Combs for the hair and for teasing wool, hemp, etc., were made of bronze, the most

elaborate ones for weavers' use being found at Glastonbury and in Scotland.

It was the Emperor Tiberius who gave the official order for the suppression of the Druids, unconscious of the birth of a new religion during his reign which would succeed in Western Europe the one which he suppressed. The influence of the Druids was already declining before the ban placed on their creed, but this blow hastened their downfall. Jupiter with a thunderbolt and a wheel was the most popular of gods. The belief in amulets and mascots and lucky colours and numbers still exists in Western Europe. The habit of wearing something red to avert the evil eye, general to-day in many European countries, can be seen in the coral and red enamel used in the decoration of arms as well as in personal ornaments. The art of enamelling seems specially a Celtic one ; the heads of nails were enamelled, also ornamented buckles and brooches, and from Gaul the custom spread into Sweden, where on the island of Gothland a school of artificers sprang up with distinct local technique.

Amber was strung with coral and shells, as, too, were weird charms such as trefoils and circles cut out of human skulls and pierced for suspension. Coral became rare when the Greeks began to trade with India, for it then went east where before it had come to the Celtic kingdoms, and red enamel took its place in decoration in the West. Tiny bronze figures, or sometimes only legs or feet, in metal, coral, or ivory were used as amulets. Lucky signs were engraved on spears and helmets, usually the wheel of Jupiter signifying the sun, the moon, or the swastika, which design was also of Oriental importation. In this custom one can trace the dying Druidic beliefs, symbols conferring good luck being all that is left of the original pure adoration of the wonders of the firmament, sun, moon, and stars.

Glass beads were made with a spiral of colour introduced ; they were circular, pierced in the centre, which idea was elaborated into glass bracelets decorated with zigzag patterns in orange, blue, or white.

There are said to have been gold-mines in the Pyrenees,

and the Tectosages, a people inhabiting the country near Toulouse, are reported to have taken part in the sack of Delphi, bringing some of the booty back to Aquitaine. They seem to have been great raiders, for their expeditions extended to the Danube valley as well as to Greece, and Cæsar reports that they seized the most fertile parts of Germany.

Silver is rare at this time, though the Gauls had learnt the art of overlaying bronze with silver, and some of their chiefs had silver-plated chariots, such as the one exhibited in the triumph of Q. Fabius Maximus, in which rode the conquered King Bituitos, taken captive in 121 B.C.

In the mountainous regions the Gauls fixed iron clamps to their shoes with studs in them, so that they could walk on ice. They evidently liked games of chance, for dice and dominoes made of stone, bronze, or bone are found in many tombs.

In 250 B.C. the Belgians, having invaded Gaul, established themselves in the north-east. Their ancestors had pushed the Gallic tribes across the Rhine, and they continued to drive out the ancient Celtic tribes, being more warlike and far less civilized than the original inhabitants. Like other warlike primitive people, they both dreaded and despised culture, and bound themselves not to trade with foreigners, and brought with them their own funeral customs. It was these people who invaded Britain and settled in the south.

The Romans considered Gaul well cultivated; iron ploughs, pitchforks, and spades have been found, as well as files, compasses, saws, and tridents for spearing fish. An echo of great feasts is heard in the variety of fire-dogs and spits for roasting joints, the huge bronze and iron cauldrons with rings on either side so that they could be hung over the blaze, the long-handled forks for stirring or fishing pieces of meat from the cauldron. Some of the iron pots had handles terminating in the heads of swans, a bird sacred to Apollo, the sun-god, and supposed to have drawn his chariot every night across the sea to the place of dawn. When the swans went out of fashion as handles their place

was taken by dolphins, also dedicated to Apollo. The saucepans had long handles ending in a swan's head, and often a fern-leaf decoration round half the rim, the swan rising from a bed of fern.

While excavating a fortified camp at Numancia, in the province of Old Castile, Spain, a camp which had been reduced by famine by Scipio Æmilius in 133 B.C., interesting painted vases of native manufacture were found by M. Schulten. The classic Greek influence affected the Iberians of the Mediterranean basin. The idea of painted vases being suggested to them, they evolved their own designs, but this art never reached the west of Spain or Portugal.

In Eastern Prussia, on the amber-route, urns have been found with human faces very similar to the Etruscan face-urns, and even to the owl-headed vases of the second city of Troy. So does design persist. Western Europe shows no such vases. The Gaulish artists, even when representing humans or animals, were apt to distort their natural forms by introducing some conventional luck-bringing design, such as an *S*, a trefoil become a *fleur-de-lis*, a double thunder-bolt, or a swastika. The subject of conventional design in Celtic art, which was developed in the La Tène period and exists to this day, is a fascinating one, and can be studied in jewellery, household effects, standing stones, and at a later date in architecture and manuscripts all down the ages.

The Druidic belief in the efficacy of the number three, a belief supposed to have been learnt from the disciples of Pythagoras, still has its hold on the peoples of Western Europe, as the most cursory glance at their creeds, art, and proverbs will show.

One thing impresses us in this central La Tène period, and this is the fact that commerce, not war, is the main agent for modifying native civilization by outward influence. The spoils of war are nothing beside the spoils of peace; a salt-mine, a deposit of tin or iron ore, a stretch of shore on which amber is washed up, forests in which animals can be hunted for their fur, plains on which wild horses breed—here are the true riches of nations, worth more than many victorious campaigns.

CHAPTER III

LA TÈNE I

Dust
Muffles the mocking panoply
With quilted silence.
OSBERT SITWELL

IT is well to give some idea of the importance of the actual site of La Tène, a place which has given its name to a whole age and civilization. Considered at one time as an armed camp, it is now thought to be a gate of entry for merchandise, an international toll-house.

Between 1874 and 1881 M. Émile Vouga excavated the site, which up to then had been completely submerged. Some waterworks altering the course of the Jura, and by that means lowering the level of the Lake of Neuchâtel by 2 metres, the station was once more on dry land. Here were the piles of two wooden bridges, remains of various houses, and masses of iron weapons, tools, and ornaments of this age, but none of the kitchen middens, burnt charcoal, and domestic utensils which distinguish the sites of Neolithic lake-villages. La Tène is unknown to history, but much the same collection of objects was found at Châlons-sur-Saône, the ancient Cabillonum, which Cæsar mentions as being a toll-house, with the rights of the ferry across the river, which produced a big sum of money. From the similarity of objects La Tène was probably the same sort of post. At one end of the Lake of Neuchâtel, it was on a great trade-route, a route which led from the Adriatic, up the Po, over the Alpine passes, and by the Swiss lakes into the heart of Gaul.

Since the Bronze Age the Celtic people seem to have been settled in the north of Gaul and south of Germany.

Between 300 and 400 B.C. Gauls from the north-east of France invaded Britain, settling in the south and in York-

shire. This was not the first invasion of Britain. About 1000 B.C. a people had come from the east, perhaps the Goidels, traces of whose language are found in the Gaelic

Mirror from Desborough, Northamptonshire

of Scotland and Ireland, and it was they who dominated the country before this Gallic invasion. The early history of Britain is a continual recital of invasions, and the Breton tongue is probably the result of an escape to Brittany of some of the inhabitants during the Saxon invasion.

LA TÈNE I

If we try to trace the Gaulish language we have a difficult task. It seems to have lingered till the sixth century in the north, long after it had disappeared in the south of France ; very few words of it are to be found in the Romance languages, and place-names give us the greatest number of examples. There were three distinct groups of Celtic speech :

1. Gaulish.
2. Goidelic (from which sprang the Irish and Scottish Gaelic and the Manx tongues).
3. Brythonic (from which came the Welsh, Breton, and Cornish languages).

No literature in the Celtic tongues remains, since the Celts considered writing unmanly for a nation of warriors ; their literature was lyric or epic poems recited and learned by ear.

The Celtic people learned something of fortification from Eastern Europe. Subject to frequent raids from their neighbours or foreigners, they lived in fortified villages into which their cattle could be driven in case of need, and which could be easily defended. The walls were built of big stone blocks mortised and held together by tenons of wood, which were used in much the same manner as the Greeks used metal clamps. In places where wood and great blocks of stone were scarce the walls were double and treble, and were strengthened by supports of carefully piled stones forming props. We have already mentioned the vitrified walls surrounding the camps in Scotland and some parts of France, and near Marseilles, where the Eastern influence had an easy entrance, towers such as the Greeks built seem to have been placed on the walls.

It was in this period that the Celts conquered the north of Italy, and in 390 B.C. took Rome. They had as early as 500 B.C. crossed the Pyrenees into Spain, and, mixing with the former Iberian population, founded the race known as Celtiberian.

During the period known as La Tène I the Celts were the most important people in Western and Central Europe. Rome quailed before them ; they raided Greece ; and they traded with the whole civilized world. The treasures

of the Orient poured over the Alpine passes, and the South eagerly awaited the returning stream of fine iron-work, furs, and slaves which came from the Celtic kingdoms.

The custom was to bury, not cremate the dead, usually grouping the tombs together, and providing food, arms, and sometimes the nearest relatives to keep the defunct person company. A tumulus, or heaped mound of earth, often marked the site of a grave. The German influence, with the habit of cremation, had not penetrated far, but in the districts where invasions were frequent tumuli are scarce, it being inadvisable to call attention to tombs, which would probably be desecrated by the enemy. In these parts the tombs are flat, but still in clusters, resembling the villages in which the dead formerly lived. The department of Marne in France is very rich in burials of this age.

It was a time of great restlessness in the Celtic nations, for as well as undertaking their Southern invasions and conquests they drove out the former inhabitants of Switzerland and Northern Bohemia, leaving their characteristic tombs to mark their progress as far west as Champagne. The Celts often made their settlements on the banks of rivers, as, besides the natural wish for water facilities, they had an adoration for flowing water and springs.

The celebrated chariot-burials in the department of Marne have a certain similarity. A shallow ditch about 3 metres long and 2 wide was dug, then on either side two ruts for the chariot-wheels, deep enough to allow the wooden axle of the wheels to rest on the surface between the ruts. The shaft and harness were arranged in another trench; the horses were not always sacrificed with the chariot. The warrior lay on his back between the wheels, his arms beside him. A kitchen knife was often included among the household utensils provided for the deceased. As a rule the dead were buried facing the east.

The first example in Gaul of coffins of wood fastened with nails is of this period. The wood perishes, but the nails have been found in the department of Marne, in Switzerland, and in Bohemia. Such burials were already customary in Etruria, and may have been yet another foreign importation. Double burials may often be explained by the already-

mentioned custom of suicide or murder of the wife, but in the case of triple burials, in one instance of a man and two youths, no theory can be established. When cremation was followed the ashes were sometimes put into a beautiful Greek bronze vase, as in the warrior's tomb at La Motte Saint-Valentin, in Haute-Marne. Beside the bronze vase was a painted Grecian terra-cotta jar and an iron sword. The skeleton of a woman lay near ; her ring, pin, and brooch were of bronze ; each ankle had a wooden ring ; and a Grecian bronze mirror lay at her side. In the tumulus raised over the warrior was found, among other things, part of a polished axe in green stone. It was long a ritualistic act to bury a miniature broken axe with the dead. Occasionally the dead were buried on the top of tumuli of an earlier age, and under the enormous tumulus at Lantilly (the diameter of the mound is 25 metres) there are sixty-five separate sepulchres, the dead being buried without regard to orientation.

Some interesting objects were found in the course of exploring a tumulus in Würtemberg. As well as a bronze vase of Greek design and a beaker, there were two beautiful gold-plated iron ornaments, which may have been the mounts for drinking-horns, and are fine examples of Celtic workmanship imitating Greek design ; various golden ornaments and two Grecian painted cups decorated with golden leaves of Celtic manufacture completed this equipment of the dead. Whether the bodies were cremated or simply buried, the same treasures were heaped around them, which looks as if there was not such a wide difference in the fundamental beliefs of the peoples practising the two cults. The transmigration of souls taught by the Druids seems not to have penetrated very deeply into the Western mind, not deeply enough to kill the feeling that what was loved on earth must be loved again, and that the human needs of food, defence, and companionship would again be felt. Julius Cæsar recorded that the Gauls wrote letters to their dead, which they burnt with them. The modern mind still feels a thrill of sympathy when confronted with a double burial, the woman with her hand on the man's shoulder, their heads turned toward each other through the dim centuries.

If over the ancient Celtic kingdoms could sound an irresistible call, "*Debout les morts!*" what a wondrous host would rise! What a clatter of chariot-wheels as the tall warriors, with yellow and red locks streaming behind them, their shields and lances glittering, dashed forward, shouting their war-cries in the tongue we have forgotten! What a procession of fair women, their long braids nearly hiding the golden torques round their necks, amulets clanking at their metal girdles, bracelets on their arms, companions of their warrior lords, accompanying them when the wander-fever seized them, dying with them when defeat confronted them!

The richest burials of the first La Tène period are found at Montefortino, near Ancona. The Greek and Etruscan influence was very strong in Cisalpine Gaul, and we find a woman buried in a crown of gold leaves, her torque of gold ending in lions' heads, her bracelets in the heads of serpents. Her needlecase, ivory comb, candelabra, cooking-pots, and vases of bronze, her mirror, and a female statuette lie beside her. Another woman has three bone thimbles, a bone needlecase, glass buttons, and seven iron knives. Her personal adornment included golden earrings and torque and a ring on which the head of Minerva was engraved.

Though the art of the South is represented perpetually in the beautiful vases and the design of jewellery, the iron sword of the North, by which these riches were won, was never forgotten in the men's tombs. These weapons were often purposely twisted and bent, since the owner could use them no more.

The sword was the most important weapon of this time, and, in fact, of all three La Tène periods. The La Tène I sword was more like an elongated dagger, short and pointed. The swords were belted to the warrior by an iron or bronze chain, and often the favourite design of a swan was introduced near the mouth of the scabbard, which was occasionally ornamented with the *S* design or conventionalized waving lines.

In Scandinavia and North Germany there are no swords of this period; the Celtic influence had not reached these

countries. Their enemies reported that the Celtic swords were not made for cut-and-thrust tactics, but there is no doubt that the superiority of iron over bronze arms, combined with fine craftsmanship, won the Celts their victories. There were many varieties in the shape of swords, the smiths being susceptible to foreign influences.

In North-east Germany and the countries round the Adriatic the swords had only one sharp side, but in Spain they were shaped like a scimitar, the handle ending in a horse's head. Such swords are seen in the hands of warriors on some Greek vases. Besides these there were short swords with horned handles of Hallstatt type.

There were interesting daggers of this time, the handles representing human figures with arms and legs extended; the scabbards, and often the daggers too, were of molten bronze. The lances had laurel-leaf points, and some a wavy edge, and when used with force they were terrible weapons. A type of javelin was in use which had a hole stuffed with tow and resin; when set alight it was hurled flaming through the air on the enemy.

The shield was the main defence of a Celtic warrior. He seldom wore a helmet, more seldom a breastplate. The Galatians are reported to have worn copper helmets surmounted by horns. A helmet was found at Tronoën, in Finisterre, made of iron covered with thin bronze, and ornamented with *repoussé* work. They were sometimes decorated with coral to avert ill-fortune, and the cheek-pieces have designs executed in enamel on them. Shields may originally have been made of wood, stretched skins, or wicker-work, for few of metal are found in tombs of this date. Grecian sculpture representing Celtic warriors shows them with oval shields, and at La Tène itself a warrior who must have been drowned in his chariot crossing the river had his full complement of arms and a wooden shield.

Bits for horses were most carefully made in iron, and so were spurs, examples of both being buried with warriors. As a rule only one spur was worn.

Golden torques or collars were worn by people of high rank, and the Roman Senate, copying the Celtic custom,

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offered them to small chiefs of Cisalpine Gaul. The fashion of wearing these rigid collars is thought to have come from the Scythians, a people with whom, as has been already stated, the Celts amalgamated, and whose customs they, with their usual adaptability, copied. A great deal of taste was shown at this time in the manufacture of bracelets. As a rule they were of bronze, sometimes hollow or overlying a

The Silver Bowl of Gundestrup, Jutland

flexible piece of wood, or ornamented with geometrical patterns. Some were made of hollow circles of bronze connected by a narrow bar, some of two narrow metal ribbons twisted together, and various districts evolved different models. All women and children seem to have worn them, judging by the tombs, and in rare cases a woman wore so many as to form a kind of armour for her arm. Glass rings, later used as bracelets, were worn hung to a torque of bronze.

While the women had metal girdles the warriors of this time had belts of skin or stuff, fastened with bronze hooks. Here was another chance for their smiths to display their artistic skill. Once again they copied a Grecian model, the

conventional palm-leaf and the Oriental griffin, which they made more fantastic by giving it exaggerated eyes and beak. Gradually these hooks developed into buckles, rich in the weird fancies of the Celtic mind. In a burial at Weisskirchen a most elaborate one was found—a human mask crowned with two letters *S*, which give the effect of horns, supported by four strange winged lions. Like the women's girdles, these buckles were of molten and not hammered bronze.

The brooch or fibula was a most important possession in those days. The brooches, which were in the form of safety-pins, had little human heads, the heads of animals or fantastic creatures, and geometrical designs, and were enlivened with enamel or coral. The brooches held the clothing on the shoulders and took the place of buttons. A great deal of ingenuity was expended on these little objects.

Some of the earrings were made of thin gold leaf studded with pearls and in the shape of half-moons or little boats. Many warriors wore a gold ring. These rings, beginning as a plain band like a modern wedding-ring, gradually became more ornate, and in them once more the inspiration of the East is seen.

The Gauls were celebrated for their magnificent hair, which they wore long ; they shaved their chins and cheeks, but let their moustaches grow. In most male tombs a razor and a pair of iron scissors are found.

Teeth of the wild boar were favourite pendants in the Celtic necklaces of this date. The custom of wearing pierced teeth had come from the days when these represented hunting prowess, but they were now used as amulets, and hung round the necks of women and children as well as men ; they were threaded on a bronze wire with shells, pieces of coral or amber, glass beads, crosses, or the letter *S* in metal, circles of human bones, and bronze figurines. Little animals in bronze were often hung from a chain ; the wild boar, ram, ox, and horse were the favourites. The ram and ox were of old the sacrificial animals ; the wild boar was a tribal sign, and had for many ages been part of the food for the dead buried in the tombs. The magic sacred signs found their way from the articles of personal adornment to the arms, to

lances, swords, helmets, and shields, and so to the medieval coats of arms, and in the end led to the science of heraldry. Engrave on your shield or helmet the circle of the sun, and no evil enchantment or poisoned arrow can penetrate the divine fire.

One of the most elaborate gold jewels of this age is the bracelet found in a tomb at Rodenbach, Rhenish Bavaria. It has in the centre a human mask supporting what look like five golden egg-cups ; two rams support the mask on either side, and the egg-cup balustrade continues along their backs, is broken on either side by a second human mask, and continues on another ram ; the completing part of the circle is plain.

The tendency to florid ornament, which was the natural outcome of the strange Celtic fancy and the Druidic creed, the impulse to leave the limits of the real to penetrate the realms of the weird and the unseen (an impulse partly climatic in a people native of regions where mists screen the wonders of mountain heights, and dense forests give no far vistas, thus making the unseen very close and half-guessed), finally led to the loss of the fine models of early La Tène jewellery, lived later in Gothic architecture, and still lives in the faint echoes of folklore.

It was not the habit to bury iron tools with the dead at this time. There are no axes nor agricultural implements, but specimens of the utensils used were found at the type-station in the Lake of Neuchâtel. Both men and women were buried with clusters of metal skewers, and a big carving-knife was often added. The iron skewers were at one time used instead of money as a means of exchange ; so were metal cauldrons and tripods. A cauldron and an ox were of equivalent value. From the cauldron the meat was removed by means of long forks with a varying number of prongs. Some spoons had teeth at one end, thus combining both implements.

For holding liquids the people of the first La Tène period had bronze beakers copied from the Grecian models, with an intricate ornament at the base of the handle. The palm-leaf, the *S*, and human masks were all pressed into the service of

this decoration. These beakers are almost invariably found in the chariot-burials, and were very general throughout

HARNESS ORNAMENTS

Southern Germany and Eastern Gaul. Once again we see that the extravagant love of ornament led the Gauls to add golden openwork to these bronze jugs, in the same way as at

Klein Aspergle golden leaves were *appliquéd* to the pottery cups. In one of the richest Gaulish tombs at Montefortino there is a big oval bronze jar with handles, a jar for holding wine ; the handles are joined to the vase beneath a bust of Diana supported by two goats. A wonderful bronze basin in beaten metal, with a fine conventional design inside the bowl, found in a chariot-burial at Saulces-Champenoises, in the Ardennes, is one of the best specimens of the handicraft of the first La Tène period.

The use of the potter's wheel gave a great impetus to the manufacture of pottery at this time, and the great advance in painted decoration made the pots into artistic treasures. These vases were not exported, and so the various districts had time to elaborate their own technique. Of all sizes, from great wine-jars down to small cups, of all shades, from shining black to pale yellow, they were decorated with mouldings or paintings. The same designs as in the metal-work, the palm-leaf, the *S*, the conventionalized animals, wander round the sides. Local artists copied or modified the imported Grecian vases, so that those found even as far west as Brittany have an Eastern European note. In a triple burial of a man, woman, and child at Matzhausen, in Bavaria, a most interesting vase was found. It lay near the woman's head and was blackish in colour ; round it was a frieze of animals, among others a stag, wild boars, and birds. It is almost Venetian in style, and shows a very high level of decoration.

We can see that the Celtic people, while developing their national taste for the fantastic and grotesque, drew the main inspiration for their civilization from the East. They buried their dead facing the east ; they brought their wine, the vases they loved, the luxury they craved for, from the Orient. They were too individual slavishly to adopt another culture ; they seized on a model, altered, and added to it, and often crushed or destroyed it beneath the weight of their exuberant fancy. And from this mixture of East and West sprang the fairy palace of Celtic art, often lost in the mists of obscurity, the home of rainbows and lost causes, on a road leading from the glare and languor of the South to the dim forests and the lap of waters.

CHAPTER IV

HALLSTATT II

Rear him hillocks that shall keep him warm,
And (when gay tombs are robb'd) sustain no harm.

JOHN WEBSTER

THE First Iron Age, or Hallstatt Age as it is called after the type-station in Austria, occupied the four centuries from 500 to 900 B.C. This civilization never reached Britain (except for a few bronze swords) or Brittany, Germany, or Scandinavia, where the Iron Age started in the later La Tène phase (whereas in Greece it had started in 1200 B.C.), so that this Hallstatt culture really concerns only Central Europe, stretching from Spain to Hungary, the East being in advance and the West retarded in development.

Though we are now dealing with the times before the greatest extension of the Celtic peoples, when their very name struck terror in Rome and Greece, when their merchants and soldiers flooded Western Europe with art-treasures from the South, their jewellery shows that the influence of Etruria and Greece was very strong and that a steady trade was carried on with the South. The latest two centuries of the Hallstatt period show great luxury compared with the two earlier ones, when, judging by the tombs, the warriors thought little of ornaments or art, a razor and a sword sufficing them as equipment.

Most of the discoveries of this age must be looked for near salt-mines. Salt and iron were the two great riches of the Celtic kingdoms, and to trade for these two commodities came the peoples of the older, more advanced South-eastern civilizations. Where trade is most flourishing wealth is greatest, and in consequence the burials are richest, and it is to tombs that we must chiefly confine our searchings into the life of this day. Except for vestiges of

fortified camps, only the heaped mounds of the graves remain to show us where people congregated in those times. One of the principal features of the graves is that they are not scattered in small clusters here and there, but are found massed together, hundreds in one group, like villages of the dead. On the plateau of Amancey, not far from Besançon, there are eight hundred tumuli, and at Aguilar da Anguita, in Aragon, the researches of the Marquis de Cerralbo near the river Jalòn, in a district possessing large salt-mines, have revealed 2200 tombs. These last had no mounds of earth to mark them, but each had a rough headstone, and as they were arranged in straight lines the result was avenues marked out with stones. Each grave held a funeral urn containing ashes, and any objects placed in the tomb had also passed through the fire. Cremation was most usual in the most modern of the Hallstatt periods, and gradually superseded the earlier inhumation, but both practices were followed, cremated and buried bodies often lying beneath the same tumulus. Strange how the two ways of disposing of the dead are continually displacing each other through the ages! These Spanish cemeteries of Hallstatt age continued to be used in La Tène times.

SWORD OF THE IRON AGE, FROM HALLSTATT

Although the Hallstatt culture has well-defined limits in Western Europe the question of its origin is still unsolved. In Egypt, Chaldea, and Elam iron had been known since very early days, but the deposits of iron ore were not very rich, so that bronze was not replaced by the stronger metal. In Russia and Finland the Iron Age immediately succeeded the polished Stone Age, without any bronze or copper intermediate stages. A civilization very similar in some ways to that of Hallstatt can be traced in the Caucasus, in Armenia, Persia, and the countries round the Caspian Sea, and may indicate the direction from which the culture came. Iron began to be used in India about the time of Alexander's campaigns.

Asia knew the use of iron long before Europe, but the principal contribution that the people of Hallstatt culture brought, a naturalistic art representing animals and humans, in direct contrast to the geometric decoration which preceded it, had a special development when the exponents had left the steppes and mountains of Asia to settle in the fertile Central European territory. The arms and tools, the process of engraving, and the style of decoration distinguished as Hallstattian in Europe can be followed from the Caucasus across the steppes to the Ukraine and up the Danube valley. We must cease to look southward for the artistic impulse. A wave of humanity comes from the north-east, bringing with it an art which has much of fancy and a love of the grotesque, but which rejects the deadness of conventional design, and fashions even the pottery vases into the shapes of birds, horses, and oxen.

A wonderful bronze vase containing burnt human bones was found in a tumulus at Grächwil, in the canton of Berne, Switzerland. On it a molten and engraved *appliqué* ornament represents a winged goddess; with either hand she grasps the paw of a lion, as well as with her right hand the front legs of a hare and with her left hand the back legs of another hare. Two snakes project from behind her head, uniting the tips of her wings, and on the snakes sit two more lions, while an eagle stands erect on her crown. Rather similar vases have been discovered in Italy, near Capua and Cumæ. The handles are attached with the heads of lions or rams, and one has a man flanked on either side by an erect lion.

It is at this time that glass vases are first met with in the Celtic countries. Three greenish ribbed glass cups were found at Hallstatt. A good many small scent-bottles have been found in tombs, usually near the Mediterranean rather than in the Alpine districts, and it is thought that the original models came from Egypt. Glass-blowing was not discovered till a later date; these vases and cups were made in a mould or by hand. An interesting golden bowl was found near Zürich in 1906. It had been placed on a flat stone upside down, and covered with a greyish earthen-

ware pot. The bowl had been hammered all over, so that it had the appearance of being studded with nails, except for the design of suns, moons, and seven animals, which

The Vase of Grächwil, Switzerland

were defined by their smooth surface. Perhaps this bowl was used in the sacrificial ritual.

Only toward the end of this period did the more luxurious habits of the peoples of Cisalpine Gaul introduce a greater variety of kitchen utensils. Spits, iron skewers, and three-pronged forks appear in the tombs. They had a definite commercial value, as coins had at a later date, and so must have represented property, more luxurious living, and

probably a more elaborate religious sacrificial cult. The cult of the dead must have taken a very important place, for strange vases which can only have been used for funeral libations are found in the tombs. Round the neck of a big jar small cups were moulded, the contents of which must have been poured out if the jar was tipped. The drawback to a complete study of the pottery of this age is that all the examples but a few fragments come from the tombs, and were specially made to do honour to the dead. In some ages a representative collection of ordinary household utensils or special personal treasures were placed in the grave, but both form and decoration of these vases refer to religious ceremonial. The swan and the horse, servants of Apollo, the sun-god, the bull and the ram, sacrificial animals, appear as decoration in or outside vases, as handles, or on plates and dishes. Sometimes, as has been said, the whole vase takes the form of an animal.

Various streams of foreign influence were flowing into Western Europe, streams which had a modifying effect on art and general civilization. Southern Gaul and Spain were well known to traders from Greece, Egypt, North Africa, and the Farther East. From the direction of the Baltic the amber merchants brought new ideas into Bavaria, Bohemia, and Silesia. North-western Gaul had less communication with Central Europe in the Hallstatt period than it had in the earlier days of the Bronze Age.

Marseilles was founded about 600 B.C. by the Phocæans, the great maritime traders. The Ligurians were already established there, and the city soon became the *dépôt* for the trade going up and down the Rhône from the Mediterranean, and of almost equal importance to Venice as a change-house. The great estactivity existed on the trade-route between the Baltic and the Adriatic, which was the chief amber-route.

There had been about 530 B.C. a great rise in the level of the Baltic and North Seas, which, submerging parts of the coast, drove out the inhabitants, who took refuge in Northern France and Belgium. Almost at the same time some of the Iberians crossed the Pyrenees and established

themselves in Southern France. Indeed, France was like a bowl, receiving small streams of immigration from all points of the compass, a fact which produced a great internal activity, from which resulted the days of Celtic domination.

Coral was first used in France at this time; in South Germany and Switzerland it was already known. In a tumulus of this second Hallstatt period in Baden an interesting necklace was found of nine rows of coral bars, the rows passing at intervals through ivory rods, which, being perforated nine times, kept the coral strings apart, and made of the necklace an upright collar.

Glimpses into the life of the second Hallstatt period can be obtained by a study of certain bronze vases and pails; these, originating in the Venetian territory, never had a wide distribution. They were decorated in *repoussé* work with scenes of sacrifice, horse-racing, and gladiatorial fights. Little men in tam-o'-shanters and tunics ride horses with tails like fern-leaves, stand in two-wheeled chariots, or sit in carts, the bodies of which end in birds' heads. A priest drops incense into an urn on a stand; a man in a nightcap, sitting on what looks like a comfortable padded chair, is given some potion out of a big ladle. Rams as big as men pace along with birds balanced on their backs. A lion prowls after creatures like ibexes, whose horns spring indifferently from their head or mouth. Winged griffins, cattle, and stags march under trees, and soldiers with round shields follow the war-chariots. This fashion of representing the incidents of daily life came from the East. The Greek colonies had extended, and the influx of trade on the salt- and amber-routes brought an echo of the style of Corinthian and Rhodian pottery into the metal-work of Italy.

Burgundy was the part of France most active in the production of the great iron swords of the Hallstatt age. These swords were sometimes more than a metre long; some of the pommels of those in the cemetery of Hallstatt were of ivory studded with amber. Bronze swords and daggers were still used, and the big iron swords, which demanded much skill in the maker, and were less easy to

wield than a shorter weapon, never reached the south of the Alps or Britain. The scabbards were of bronze, often with two horns or ears sprouting from the tip, and later of iron, which took the place of the older wood or leather

Bronze Vase from the Tumulus of Sainte-Colombe, Côte-d'Or

sheaths. The whole was usually wrapped in a cloth when placed in the tomb.

The villages of this time consisted of huts clustered together, and in some cases defended by a rampart, as at the Camp d'Affrique, near Messein (Meurthe-et-Moselle). Here inside the walls there were mines of iron ore, which no doubt were the reason for the original settlement. As

neither brick nor masonry was used in house-building, the traces left us are very slight, but as a good many villages were built in the valleys life was evidently calmer, and it was not necessary invariably to choose the site with a view to natural defence. The Camp d'Affrique settlement was surrounded by one of the vitrified walls already mentioned, in which the dry rocks of which the wall was built had been subjected to so great a heat that the stones had fused into a solid mass.

Chariot-burials first made their appearance in France in the Hallstatt Age; they are not numerous, and are in Burgundy and Franche-Comté. The chariots, unlike those of a later age, have four wheels; no harness is buried with them, no bits for horses, and they may have been merely funeral cars on which a chief was drawn to the tomb or on ceremonial occasions among his people. Great skill in workmanship is shown in the iron wheels of these chariots, which are quite unlike the light two-wheeled war-chariots of the Greeks.

It is to the eastern territory of the Hallstatt civilization that we must turn for the richest burials. The necropolises of Croatia, Bosnia, Istria, and Styria yield the greatest number of treasures. At Santa Lucia, near Tolmino, in Istria, seven thousand tombs have been opened, and this necropolis is of the same age as the fortified prehistoric villages of which several hundreds have been excavated in the same regions. A votive chariot in bronze was buried in a grave at Strettweg in Styria. It is a platform on four wheels, in the centre of which a tall goddess supports a platter on her head and upraised hands. Mounted soldiers and people on foot present the heads of stags, as if for sacrifice. The graves in Eastern France are of a rather more recent date than those in the other regions under Hallstatt influence; they represent one of the outer ripples on the western edge of that culture.

There was much more traffic between Southern Bohemia and Eastern Gaul at this time than between Eastern and Western Gaul. M. Hoernes, in his well-known work on the Hallstatt civilization, traces four separate centres of distri-

bution. One in the Adriatic region spread over the south-eastern slopes of the Alps, and comprised Bosnia, Herzegovina, Slavonia, Croatia, Southern Styria, and Carinthia, touching the Italian and Greek zones of civilization. Another occupied a central position in the valley of the Danube and the Eastern Alps, including Northern Carinthia and Styria, Eastern Hungary, Austria, Southern Bohemia and Moravia. The third centre followed the Elbe and Oder, and included Northern Bohemia and Moravia, Silesia, and Posen. The fourth and last spread over the south and west of Germany, Northern Switzerland, and Eastern France, and was really a tributary of the second group, the influence coming down the Danube valley.

Wherever the trade-routes bring merchants from the South in search of salt or iron the influence of Etruscan and Grecian art and luxury is found in the tombs. It was in 650 B.C. that Demaratus was said to have come from Corinth and first started sculpture in Italy. Beautiful bronze vases of Greek form now hold the bones or ashes of the deceased; a polished stone axe is ceremonially broken; there are golden ornaments.

The earliest known iron horseshoes were found at Aguilar da Anguita, in Aragon. This was a district celebrated for its finely trained horses, to which both Strabo and the poet Martial refer. The women of the district seem to have worn a curious iron erection on their heads, springing from a thin iron collar and designed to support their coiffures. Fine iron weapons were also made here, the waters of the Jalòn being supposed to be specially good for the tempering of iron arms. Like the Italians, the Iberians preferred a short iron blade to the very long iron swords of Gaul, and their weapon was not unlike the horned Gallic dagger. The brooches of the second Hallstatt period are often without springs and in the form of snakes, crossbows, and kettledrums, and in Spain there were amusing ones of horses or knights riding.

Iron lances were laid in the graves in pairs; they were very well made, and sometimes inlaid with bronze and in Spain with silver. Stone, as well as pottery and metal, was used for the construction of vases; a vase of this kind, cut

out of a block of schist in which there were garnets, was found in a grave at Chemilla, in the Jura. It had been purposely broken and laid at the feet of the dead in what, judging from the bracelets found near, was the tomb of a woman. A series of bracelets were sometimes united by a bar, thus making a solid armlet ; they were of bronze, iron, or lignite, and occasionally of gold. Ankle-rings of the same materials are found in many tombs. Besides these, women wore a leather belt ornamented with copper or bronze medallions and amulets, wheels of Jupiter or other lucky signs. Various bronze disks, found in women's tombs, decorated with conventional designs engraved or in openwork, have been thought to be a sort of waist-buckle. There were also big pendants of bronze slung round the neck by a chain and worn on the chest ; in one case from a bar of pierced bronze a series of triple rings each ending in a wheel-disk hung down. It must have required a great deal of physical strength to wear many ornaments in those days ! Not much gold is found in the tombs—none in France except in Burgundy and Franche-Comté, which had the most flourishing trade. On the Butte des Mousselots a woman was buried in golden bracelets and earrings, and an occasional golden torque, a cup, or some buttons are the greatest treasures. For the first time little clusters of toilet implements strung on a metal ring are buried with the dead. These little collections of toilet articles were most carefully made, and in Italy included tiny pots for perfume or grease-paint—in one instance made of silver. They are found in both men's and women's graves. Some of these burials are Hallstatt in civilization and La Tène in age.

We can see that the people who brought the so-called Hallstatt culture to Central Europe were very susceptible to the charms of an easier, more comfortable life, and that, enriched by the natural resources of the countries they settled in and by their own energy and skill in metal-working, they developed a more elaborate civilization, a richer ritual, and did not withhold from the dead the greater luxury claimed by the living.

CHAPTER V

HALLSTATT I

I see
How every time with every time is knit,
And each to all is mortised cunningly
And none is sole or whole, yet all are fit.

SIDNEY LANIER

IN the early days of the Iron Age Eastern Gaul and Southern Germany were more united than Eastern and Western Gaul. Once more trade had worked its unifying process, principally through the medium of that fascinating fossilized resin known as amber. The amber-route led from the shores of the Baltic to those of the Adriatic, over the Swiss passes and thus into Gaul. The amber was passed by hand from people to people who trudged their way along old paths which in later ages were transformed into roads by the Romans. Legends had always gathered round it. It was the tears of his sisters shed when Phaeton the sun-god fell from his chariot and was killed. It had marvellous healing properties. The country of its origin was carefully hidden from the Greeks, who, receiving it both from the Adriatic ports and the Black Sea, told of a mythical river of amber, which they tried to identify with both the Po and the Rhône.

The Ligurians were great traffickers in amber, and the main stream of the trade can be traced by the greater or lesser quantity found in the tombs of a given district. Very little reached the west of France. Besides the common interest in trade, the peoples of the amber-route seem to have been allied by similar religious beliefs. As they passed from hand to hand the congealed tears shed for the sun-god they wore as mascots wheels representing his fiery course, and their clothes were fastened with brooches on which spirals formed a sun-disk. The long, dark winters increased the ardour of their worship, and bonfires were lit to coax the god

to return, a practice which has continued under different forms to the present day. They raised no temples to their divinity, as they built no palaces for themselves, but to their caravans toiling over the Alps or trailing across the European plains day after day their god looked down, or hid his face ;

So-called Gaulish God

and night after night his place was taken by the lesser divinities of the moon and stars. When they halted by a river or well for refreshment their god was there in the bubbling water, and in the dense forests was hidden in a myriad trees. Why build temples to hold Those who were ever present, who were met at each new turn of the road ?

And so these Celtic peoples, who were no nomads, though raiders, invaders, and traders, moved perpetually about their world, carrying on their backs like busy ants the produce of varied civilizations: great jars of wine, vases which Greek

genius had designed, iron weapons from the hidden forest forges of their own smiths, amber and coral and ivory, woven stuff and furs. Taking a fashion here and there and adopting it, sometimes a model for an *objet d'art*, sometimes a ritual for the dead, but keeping their own manner of making war and their own religious beliefs, seeing temples, but building none, seeing statues of divinities, yet seeing no god as man, they held on their way, weaving a perpetual chain between West and East, North and South, till it is hard to say from where they came or whither they went, so much have they permeated the more sedentary, less energetic peoples.

A general movement of expansion was affecting Europe. The Etruscans are said by Strabo to have built their capital Vulturnum (the modern Capua) in 800 B.C. Greece was extending her colonies at the same time that the Celtic tribes were pressing southward into more luxuriant countries.

The Ligurians were already settled in Northern Italy and on the left bank of the Rhône. They were noted agriculturists; their women worked in the fields, and they were among the first Gallic people to employ yoked oxen and to sow corn and barley. They were closely allied in race to the Thracians and Illyrians (Albanians), their near neighbours, and all three brought from the East, by way of Greece, fragments of a far more advanced civilization when they took possession of the shores of the Adriatic. The Celtic tribes coming down from the North on their way to Gaul mingled much with the Ligurians, and either shared their territory or else immediately succeeded them in the possession of certain districts, where the people became so intermingled that they have been referred to as Celto-Ligurian or Celto-Lygian.

The type-station of Hallstatt in Austria owed its prosperity to the deposits of rock-salt in the neighbourhood, and to the fact that it was on the amber-route. M. Georges Ramsauer explored the site, and in seventeen years found 993 graves. A great number of weapons of this period were found in the tombs—swords, lances, and axes of both bronze and iron. There were also bracelets and belts, cups and vases, plates and urns of foreign importation, including an urn with a pro-

cession of strange beasts on the cover ; winged lions, a stag, and an ibex walk round it, each animal evidently consumed with hunger, snatching at food as it marches. Thousands of amber beads were found here, even in graves with otherwise a poor equipment, which shows that the value of amber increased greatly when far from the principal route of its importation.

The method of extracting salt in marshy districts was ingenious. Terra-cotta cisterns were filled with water from the salt-marshes and placed on scaffoldings of clay rods built up as if these rods were sticks for a huge bonfire ; a fire was then lit below, and, the water boiling over on to the clay rods, the salt crystallized on them. The fragments of these terra-cotta erections have sometimes been taken for the remains of a tiled road. Salt-marshes were a frequent cause of war, the possession of them meaning so much prosperity to the owners.

URN-LID, FROM HALLSTATT

Deposits of iron ore were also very valuable, and not being as a rule near the seacoast led to the making of a series of inland roads, the roads of iron. The discovery of iron ore in Eastern Gaul ruined the prosperity of Brittany, which before then had been on the main trade-route for the tin of Britain and the gold of Ireland. The Irish gold-supply was diminishing, and the sudden superior importance of iron and the birth of a civilization depending on it hurried the collapse of the trade by diverting the stream of merchants to a more profitable commerce. This collapse can be seen by the deterioration and sudden poverty in the memorials to the dead on the gold- and tin-routes.

The struggle for the two wealth-bringing commodities explains the existence of the many fortified camps and settlements in the regions where salt and iron were abundant.

They were retained at the cost of many lives and much labour. All along these routes have been found the buried stores of merchants, compelled no doubt to abandon them by a sudden turn of fortune, burying them for safety, and never able to return and dig up their *cache*, which their enemies never found. Is it any wonder that stories of buried treasure have been so popular in every age ?

The habit of erecting great mounds of earth (tumuli) over the dead may have been brought from Greece, where it is known to have been the custom of certain important families. These mounds were sometimes surrounded by rows of stones marking sacred precincts to be used for religious ceremonies to do with the cult of the dead. Occasionally a tumulus is empty, and this may have been because, like the Greeks, the Celts erected a commemorative monument to the dead, a cenotaph, without a grave.

In the beginning of the Iron Age most people were cremated, but toward the end the fashion of simple burial came into favour ; the peoples round the Adriatic seem always to have preferred cremation, and most of the treasures have been found where the dead have been burnt. There was a strange practice of not burying the whole body—the head is missing, or the whole skeleton is broken up and the bones arranged in certain patterns ; and there was also an uncanny custom of cremating only part of the body, the rest being buried beside the ashes, the whole skeleton having been disjointed before the ceremony began. The French tombs of this date are poorly furnished ; their occupants seem to have been a race of hardy warriors whose funeral equipment was mostly limited to a sword, a razor, and perhaps a cup. They still despised, or were still too poor to indulge in, the rich funeral trappings of their descendants. It was probably poverty more than pride, for in the Danube valley, where the people were richer, a sword of the period was found in a grave with a handle lavishly decorated with golden leaves. Near Bellinzona there is an immense necropolis or collection of necropolises, places which were in use for centuries. The amber-road passed by Lago Maggiore to reach Switzerland, and so that part of now comparatively

sparsely populated country was then a very busy trade-centre.

A large bronze vase was found in the necropolis of Hallstatt, the handles on either side like bronze ribbons fastened to the base by a wheel of the sun, from which hung a metal tassel. These being early days in the handling of iron, much use was still made of bronze, and the same technique as had been developed by the workers in bronze was employed in dealing with the newer metal. This vase with handles was of the type used for holding the ashes of the dead. It is thought that some of the chariots of a heavier type than the later war-chariots, remains of which are found in the tumuli, were ceremonial vehicles drawn by hand in religious processions, the double-handled urns being probably slung on them, and the chariots serving the same use as a gun-carriage in a modern military funeral. With the heavier type of chariot no harness and no horses are buried.

To the Northern peoples with their greyer climate the sun was a wheel of fire which a horse drew along the heavenly road ; the peoples round the Mediterranean, with their sun-drenched atmosphere, made of it the rays behind the head of a god who in a chariot with four horses drove in wild career across the firmament.

Though Gaul and Britain produced in later days the finest smiths, it was the traders coming to Venice by the Adriatic to fetch amber who introduced the idea of the use of iron, this metal having been used for some centuries in the valleys of the Euphrates and Tigris. A buried store of iron ingots pierced with a hole so that they could be carried was unearthed not far from the site of the ancient Nineveh. Like the cauldrons and skewers of a later date, they had a definite commercial value, and were a rather clumsy kind of money. It was about 900 B.C. that the use of iron became general in Italy and Central Europe and the Alpine districts connecting them, and it is near the shores of the Adriatic that the first smelting-furnaces are found, showing plainly that the knowledge of the natural resources of the country and how to develop them came from the traders of the South to the raiders and immigrants from the North who had seized on

a fertile mid-European territory and made it their own. By this discovery the Celtic people held the seed of their liberty and power ; there was no need to buy weapons from adjoining nations, or trust to sudden raids for the repletion of their stocks ; they could retire into their forests, and in the deep shadows watch the spirts of flame, and listen to the clanging of hammers on anvils where their own smiths forged the arms which the prowess of their warriors made respected and glorious. They learnt that the iron of peace brought them as much as the iron of war, and piling the ingots their merchants went with them to one of the trade-centres, exchanging them for the wine they loved and which (not having learnt the cultivation of the vine) they could not produce themselves, for the painted vases and other artistic treasures of the South and East. Seeing thus many nationalities and many civilizations, they drew inspiration from the clash of wits, and seizing on foreign ideas smelted them in the furnace of their native genius and drew forth a culture which owed birth to outside influences, yet was their own.

Like them, we must take to the road with our little knowledge, and journeying eastward seek for the people of wider experience whose handiwork our ancestors so much admired. The great monuments for the dead, the worship of the sun-god shall lead us ; these at least we shall have in common with our unknown teachers. From whence came the bronze urns and vases in the Celtic tombs ? How far along the road to comfort and luxury had the people gone with whom the Celtic tribes traded ? Where were they themselves before the country of Gaul drew them to a more settled existence ? Leaving the forests, we take to the caravan-routes, and, passing the Alps, salute Apollo as we tramp toward the East.

CHAPTER VI

BRONZE AGE IV AND III

900–1600 B.C.; INTRODUCTION OF BRONZE AND COPPER INTO EUROPE, 2000 B.C.

Time's painted gates are open wide,
The Old Gods give me their embrace.
OSBERT SITWELL

THE Bronze Age, so called after the metal most in use, lasted in all one thousand years. The centre of the civilization accompanying the knowledge of bronze-working is to be found in Eastern Europe. Crete and Greece were the heart of the culture, which drew some of its inspiration from Egypt, and influenced the Celtic peoples through its offspring, the Etruscan school.

Etruria had seized Elba and Corsica, and at the height of her power included almost the whole of modern Italy in her kingdom. She divided her territory into three districts, and each district into twelve states, each state represented by a city. These many divisions had a lasting effect on the country, as can be traced through the Middle Ages, when alliances between or against individual states or cities distracted Italy, down to the present day, when Neapolitans are spoken of as foreigners by Florentines or Milanese, and "Italy one and united" is still in many respects an unrealized ideal.

From where did the Etruscans come? is rather a difficult question to answer. Roman historians writing of them give no accurate details of their origin, and probably did not know it. When these people invaded Italy they found a land already occupied by two races, the Siculi and Umbri, very primitive people, but town-dwellers. The invaders came into Italy at the head of the Adriatic, and may have been a people of Greek race—some think they came from Thessaly. The city of Falleri, now but a ruin, had a legend that

Haliscus, son of Agamemnon, drove out the Siculi then inhabiting the town, founded two other cities, and dedicated a temple to Hera or Juno, the goddess of Argos, and that finally he and his people either were conquered by or made a treaty with the Etruscans.

On the other hand, the Etruscans themselves at a later date claimed that they came from Lydia, and it seems certain that the invasion of Italy was one of successive waves of immigration in which at least two different peoples were concerned; in some districts they amalgamated, in others

Greek Women making their Toilette

the stronger seized the cities from the weaker. What is certain is that the invaders were a highly civilized and cultured people, having priests, princes, and military leaders, great skill in art, a wide commerce, and an elaborate religious ritual. They were not pure Greeks; they had much in common with the Babylonian and Assyrian cultures; their musical instruments, the trumpet and double-pipes, came from Asia Minor. Like Lydian and Persian monarchs, their rulers wore purple robes; like them, they wore the toga, which in later days the Romans adopted. Their military ensign was the same as that of Persia, the eagle. One respect in which they greatly differed from the Greeks was in the position which they gave to their women. They traced their descent through the maternal line, and the women were not shut away, but attended feasts with the men, and were said even to have joined in the drinking bouts.

Judging from the types represented on the funeral monuments the Etruscans were very Oriental, almost Mongolian, in appearance.

It is the problem of the language which points to a more

distant origin for the Etruscans than that of a comparatively near birthplace in Asia Minor. The language stands apart from any other known tongue, and in spite of the efforts of many students of various nations remains undeciphered. It has an analogy with the Basque tongue in that both in their complete isolation from any language, ancient or modern, known at present by the human race might have been the speech of some other planet. The Etruscan writing was from right to left. The Basques have by a series of happy accidents escaped extinction, so that Basque is still a living tongue, but the Etruscan inscriptions face us on their monuments in all their baffling obscurity, to remind us how little the heart of Europe knows of the people who brought her so much of her artistic wealth.

The religion of the Etruscans was one of fear and mystery. Tinia was the supreme deity, who speaks in thunder and descends in lightning and carries a thunderbolt with triple points. Thalna was a goddess—it was said of births and light. Menra was similar to the Greek Pallas Athene. Behind these three were twelve great gods, six male and six female, fierce and cruel, whose names must not be mentioned, and behind them the Shrouded Gods, ruling both gods and men. Their sacred law or system of divination was said to have been revealed to the Etruscans by a marvellous boy, who sprang from a furrow while a peasant was ploughing. The worship of the household gods, the Lares and Penates, was one of the most important points in the Etruscan creed, which also was borrowed from them later by the Romans. The underworld was peopled to the Etruscans with demons and furies, presided over by a male and female god, Mantus and Mania, the latter with head bristling with snakes like Medusa's, who could be pleased by human sacrifice. This host of gloomy and terrific deities, inspiring fear rather than confidence, whose will could be known only by divination, produced a body of priests and magicians who, backed by their claims to be the sole interpreters of the dread unseen, imposed their cramping rules and the restrictions of priest-craft on the whole of the body politic. This was the reason why Etruria with her great genius never produced individual

artists of such eminence as the great Greeks. The fettering restrictions of the priests suggest the days of the Spanish Inquisition.

The terra-cotta statues, sarcophagi, and vases of Etruria are famous. Many busts, obviously portraits, are found in tombs. A fantastic jug for wine, half pottery half sculpture, was found at Vulci; the jug itself was the head of Pallas

From a Greek Vase in the British Museum

Athene, her helmet forming the spout; her earrings were winged female figures, the head of a woman rose from two leaves above her brow, and two more female figures in relief reclined on either side of the handle attachment; the whole was coloured. The earliest Etruscan vases were made by hand, unpainted, sometimes only dried in the sun, and at most had a geometrical decoration scratched on the clay when wet; these are found in the "well tombs" or beneath volcanic ash at Alba Longa. From scratching the Etruscans went to stamping the decoration on the brown or red pottery. The oldest painted vases have men and beasts drawn in white on red or in red on a biscuit ground; they are not unlike the

Greek "Doric" vases. Though more painted vases were found in the tombs of Etruria than in those of Greece, it seems likely that the originals were Greek, and were copied and elaborated by Etruscan artists. The ones with geometrical painted ornament resemble the vases found at Mycenæ, and are entirely Oriental in character. Rather more recent are

A Greek Cup

the ones in which animals and sphinxes and griffins face each other, painted in white, red, purple, or brown on a light background. Some of the finest specimens may have been imported from Corinth, which was renowned for this type. Next came a school which chose subjects from the deeds of heroes; they painted the male figures in black, the flesh of women white, and their eyes almond-shaped, as in the Egyptian paintings. In Athens such vases were given as prizes in the athletic games. The finest vases of all have figures of a reddish yellow on a black background, and continued to be produced till the time of Alexander the Great, when the art of pottery-making declined, his wars bringing

from the East the knowledge of making metal vases. The decorations usually represented Greek myths. In the time of Julius Cæsar the art of making these painted vases was lost, and they were much prized. Whether Etruria produced all the makers of this art, whether she copied imported Grecian models, or whether she encouraged the artists to come from Greece and settle in her dominion will never be known exactly, but it is certain from the many examples in tombs that these vases were among the most highly prized possessions of the Etruscans.

Etruria had a literature ; histories, plays, and songs are mentioned, besides a great many books dealing with religious ritual. The Etruscans were famous agriculturists, military strategists (these two subjects are so antagonistic that they point to a mixed racial origin), fine doctors, and in the science of astronomy were unrivalled. Their computation of time in the tropical year as 365 days, 5 hours, and 40 minutes was a notable achievement. In many ways the Etruscans remind us of Aztecs and Peruvians ; the former have also measured time more accurately by the stars. The Etruscans were notable as engineers ; they drained lakes, changed the course of rivers, and cut roads and gutters through the rocks. Their drainage system is still famous—the Cloaca Maxima in Rome is their work—and traces of their careful sanitation are found on most of the sites of their cities. After centuries their constructive work still stands, and in this and in the hewing of their rock tombs they remind us of the Egyptians. Their naval supremacy was renowned ; their coins were stamped with the prow of a ship, and they rivalled Carthage on the sea. They were proud of their world-wide commerce, and no one can measure how much their civilization influenced and modified that of the surrounding nations. One of their peculiarities was that they reckoned their day from the hour of noon, while the Roman day started at midnight and the Greek at sunset. We know that the Romans copied their military formation—the phalanx—their helmets, and perhaps their shields, that they adopted some of their gods, and sent their youths to study the Etruscan literature. We know that the Celts bought and

then copied their vases, that they copied too their torques, their modes of burial, and in some measure their luxury. The Celtic trading activities may have been stimulated by the brilliant example of the Etruscans, who traded equally on land and sea, whose bronzes were found in Northern countries, while in a tomb at Vulci lay an engraved shell of a kind known only in the Far Oriental waters, mostly near the Japanese coast.

No Etruscan temples exist, partly owing to the fact that much wood was used in their construction ; but the more modern temples built on their sites owe much of their inspiration to the original edifices. This we know from terra-cotta models of vanished temples found in the tombs. The city-walls of Etruria still stand, unaffected by the passage of centuries and endless wars. These walls are extraordinary monuments, and their gateways show that the Etruscans knew the principle of the arch ; their perfection in this knowledge is shown in the construction of the Cloaca Maxima.

The rock tombs of Etruria were not mere cists hewn out to hold the dead, but were often provided with a complete set of rock furniture imitating the surroundings in the life of the deceased. Weapons hung from the ceiling, and a life-sized coloured figure of the dead person reclined on a rock couch. Thus the domestic surroundings of these strange people are preserved to us. Their earliest tombs seem to have been " well tombs " such as are found at Mycenæ, in which in a circular cavity walled with stone a great earthenware jar is deposited, containing cremated human remains, a bronze razor, pots and weapons of bronze, and the personal treasures of the deceased.

The island of Elba provided much iron ore, and the Etruscans worked in iron, in bronze, and copper ; it was they who made the first metal statues in Italy. Though they eventually studied the Grecian masters of sculpture, acknowledging them as their artistic superiors in delineation of the human form, Greece always admired the artistic genius of her pupils.

A similarity between the Etruscan and Celtic peoples

was their love for jewellery. A good deal of amber was used, sometimes cut into the shape of animals not known in Italy, such as monkeys and lions or leopards. Some idea of the trade in jewellery is given (or is it the limitation of human invention?) when the same ornaments as are found in Etruria are also met with in Norway, Sweden, and Mexico. Much analogy exists between modern Hindu jewellery and the jewellery of the best Etruscan style, especially in the filigree work, though no workers since have attained quite the standard of perfection reached of old in Etruria.

Besides containing many bronze articles, such as candelabra, large jars for holding incense at the funeral feasts, vases for holding cremated bodies, and every kind of weapon and armour, these rock tombs were sometimes painted or had a frieze representing weapons, so that the hall of death appears like an armoury.

In the so-called Tomb of Reliefs at Cervetri this is the case. Thirteen couches for the dead are hewn out of the rock, divided from each other by carved pillars painted red. From the foot of the couches projects a platform divided into beds by narrow grooves cut in the rock; there are thirty-two beds. On each pillar a round shield is carved; two lotus-flowers droop from the capital above it. All round the wall above the pillars runs a frieze on which, in high relief and bright colours, are swords, helmets, shields, stone balls, bronze dishes of various shapes, a trumpet, red and yellow skull-caps, two bulls' heads bound with a garland as if for sacrifice, and many swords, some sheathed and some naked. When the tomb was first opened the place of honour was occupied by a skeleton in a full suit of bronze armour. A god of the underworld holding a rudder, his body ending in snakes, was painted on the wall below this warrior. The terrible dog Cerberus, his three heads painted white, black, and red, and his neck encircled by bristling snakes, stood under a stool. A second body once lay beside the man in armour, probably that of his wife, but both have long since vanished into dust. Pitchers and knives, drinking cups, a mace, pincers,

a gong, and a red bag fastened with a pin are all painted on the walls, while at the foot of one pillar a spotted cat is catching a mouse, at another a goose is picking up corn, and at the foot of a third a tortoise, dog, and lizard are playing.

The tombs were not always in one hall ; sometimes rooms branched out on either side, and there was an anteroom. If coffins were used those of males had iron nails and those of women bronze nails with gilt heads. The decoration of the halls was extremely varied. Frescoes of feasts and processions, of kitchen and domestic scenes, ran round the walls. Beautiful ladies lay on couches beside their admiring husbands or friends, waited on by slaves ; they held in their hands eggs or pomegranates or cups of wine ; musicians played behind them ; dogs and cats waited for the crumbs ; servants carved birds on the sideboard ; and men and women alike were crowned and wreathed with flowers. Bronze candelabra were lit, though the couches were under trees, and the feasts evidently *al fresco*. Dancing girls and men in floating draperies entertained the company. The Etruscans were said to be so fond of music that they even hunted to the sound of lutes. There is a strange contrast between the gloomy rock caverns hollowed out for the dead and the scenes of revelry depicted on the tomb-walls. Life-sized effigies of the people buried lying on earthenware or stone couches and coloured vividly must have made these sham feasts hauntingly realistic. No religious element, unless an occasional painting of a demon, Cerberus, or a genie can be so called, found its way into the scene. One can imagine how at the funeral feasts which took place in these rock-hewn halls, when from the copper bowls rose clouds of incense and burning perfumes to ease the atmosphere, and on either hand the mouldering skeletons or coloured effigies were seen dim through the smoke, when the wine circulated, and the melody of pipes came from the shadows, the people must have recoiled before the unknown, terrifying gods, and turned to orgies and the gaiety of luxurious life with all the ardour which under the influence of an ascetic visionary creed drives humanity to renounce

the seen for the unseen. Men cannot be frightened into righteousness. Perhaps the Irish wakes had their origin in the influence of the Etruscan burial customs on the Celts.

Some of the tombs had an Egyptian character in their mouldings, as in the Regulini-Galassi tomb at Cervetri, opened in 1836, which had not been rifled before and contained an immense number of silver, bronze, and gold articles. The bier was of bronze ; two iron altars stood one at the head and one at the foot, where was also a shield and a bundle of darts. More bronze shields leant against the wall, not meant for use in battle, as they were too thin. Iron cauldrons with griffin-head handles stood on tripods inside the door, no doubt for the incense, and near was a four-wheeled car reminding one of the cars in the Celtic tumuli. An inner room with doorway half built up had the vault hung with bronze vessels ; a vase of pure silver was suspended on either doorpost, and on the ground, beyond the usual bronze cauldrons, lay the golden ornaments which had once decked the corpse, of which there was no trace left. Breastplate and head-dress, necklace and earrings, bracelets and twisted chain, rings, and eighteen brooches were all of pure gold ; indeed, there was so much gold that there might have been an entire garment of metal. Two silver vases with carved reliefs lay near the wall. All this treasure is now in the Gregorian Museum at Rome, and we shall never know if it was a great queen or a high priest who was buried with so much pomp.

Many of these tombs, when not hewn out of the rock-face, had a tumulus erected on top of them. When the earth happens to be washed or worn away from the cover-stones of these tumuli there is a striking resemblance between them and the cromlechs of Britain and Brittany ; the supporting stones on either side bearing up the cover-stone form a dolmen, and may have inspired the ones with which Western Europe is so well acquainted.

One cannot give more than a hint of the extent, richness, and interest of the Etruscan necropolises. If we have no key to the language of the Etruscans, and are ignorant of their

origin, few people have left us more accurate and detailed pictures of their domestic life and favourite pursuits and

THE SUN-GOD IN HIS CHARIOT

pleasures. Their jewellery and physical characteristics, their furniture, their slaves, and their animals are all depicted for us. Even the materials of their clothing can

be studied : the diaphanous stuff of the dancers' garments ; the embroideries on the ladies' tunics and mantles ; a cross-barred, many-coloured material not unlike tartan, which the Celts may have copied ; above all, their boots, for which they were celebrated—red boots, blue boots with tassels, golden sandals—they were always well shod. We step into the world which so fascinated the Celtic peoples that they were ever after held captive by its charm, a world of splendid possessions made of metal, in which men twisted bronze, gold, and silver to their will, in which one feasted to music in the company of fair women, left to priests the study of the unknown and intangible, knew little more of the national origin than of man's future destiny, and left behind works of practical engineering and triumphs of sanitation which astound us to-day.

The actual chronology of the age in which bronze was in the ascendancy is rather hard to tabulate. Though they were not finally crushed by Rome till 283 B.C., the Etruscans were said to have established themselves in Italy about 1044 B.C., and from that date their influence was tremendous in European civilization. It has also been pointed out that there was a great migration from Greece into Italy about 1000 B.C., and that Etruria was said to have been colonized by the Lydians in 1200 B.C.

We have lingered long enough among these people who built and adorned these palaces of the dead. Were there none building palaces for the living ? Did the Celtic traders not see in the course of their trading travels life in magnificence unsurrounded by corpses ?

The sixth city of Hissarlik, the ancient site of Troy, excavated by Dr Schliemann, had pottery similar to the early Etruscan type, which makes it probable that there was a Lydian settlement there contemporary with the colonization of Etruria by the Lydians, mentioned by Herodotus. According to this writer, that colonization took place about 1200 B.C., and half the Lydian population emigrated to Umbria, led by Tyrsenus, a royal prince. It is certain that the Troad (the district round Hissarlik) was subject to the Lydians from 698 B.C. to 660 B.C. under

their king Gyges. This Gyges paid tribute to Assyria after Assurbanipal, the Assyrian monarch, had concluded the campaign ending in the destruction of Thebes, for on the inscription enumerating the payers of tribute he is mentioned as Gyges, King of Lydia, "a far country across the sea of which the kings my fathers had not heard."

Turning to Greece, Mycenæ, also excavated by Dr Schliemann, is the site which has yielded us most information about this age. This city was famous for its pottery, which was exported to Egypt, for vases of Mycenæ were painted on the walls of the tomb of Rameses III. Mycenæ was at one time the richest and most powerful state in Greece. One of her latest exploits that we know of was the equipping of eighty men who took part in the battle of Thermopylæ, and then the city was sinking downward to its final decay. The name of Mycenæ is engraved on the stump of the brass column of twisted serpents which commemorates the Grecian cities and tribes who united to repel the invader in that historic battle. This stump still stands on the site of the old Hippodrome at Constantinople. This very exploit, by exciting envy in the Argives, who had remained neutral, and feared that the Mycenæans might try to dominate them, brought trouble on the city. The Argives made a league with the Cleonæans and Tegeans, and besieged Mycenæ in 468 B.C. So well built were the walls of the city that assaults had little effect on them, but the town was starved into surrender and the people either enslaved or forced to emigrate. Part of a silver vase found in the excavations shows a battle under a city-wall, in which archers are supported by slingers—probably a good picture of the actual fighting, as many sling-stones were dug up. The walls of the lower city were razed, but the citadel, being sacred to the goddess Hera, whom the Argives also worshipped, was left almost intact.

The great days of Mycenæ were before these times. She was celebrated for her immense wealth and her broad streets. Homer called her the "well-built city." Her walls, of the construction known as Cyclopean, still stand.

Thucydides stated that the foundation of her wealth was the great treasure brought from Asia by Pelops, he who numbered among his descendants the hero Agamemnon. The subterranean treasuries built to hold some of the rulers' riches—and also it may be as tombs—have been discovered by Dr Schliemann during his work. They are mentioned by Pausanias, as is the " gate on which stand lions," which has also been unearthed. Most interesting of all are the supposed tombs of Agamemnon and his companions, who were said to have been murdered at a banquet by Ægisthus on their return from Troy. The murderer and Clytemnestra, his fellow-criminal, were in turn killed by Orestes, and were not considered worthy of being buried inside the citadel, where their victims lay. The bodies in the tombs discovered at Mycenæ had all been buried at the same time. The funeral pyres had hardly burnt themselves out before clay and pebbles were thrown on them; none of the bones were destroyed, and where armour or masks had protected the dead the flesh was not burnt. When the original tombstones sank or were covered with the dust of ages fresh stones were erected exactly over the old ones.

The exact date of the tombs of the acropolis of Mycenæ cannot be given, but they are supposed to have been constructed between 2000 and 1500 B.C. The so-called treasuries or cupola tombs and the palace are thought to be of later date—between 1500 and 1100 B.C. This chronology has been constructed with the help of Egyptian finds. The reign of kings at Mycenæ is thought to have ended about 1104 B.C., at the Dorian invasion.

On the rediscovery of the tombs by Dr Schliemann it was objected that if Agamemnon and his friends were murdered they would not have been buried with ceremony and with valuables, but judging from Homer a sort of religious dread caused a murderer to bury his victim with his weapons and possessions. The half-burnt state and the strange cramped position of the bodies, which were huddled together, points to a great haste and a lack of ceremony. Four of the tombstones were carved with

battle-scenes—such as a warrior in full career in his chariot —set in a frame of geometrical patterns, elaborations of the spiral. Being shattered and also corroded by weather, the designs are somewhat fragmentary. In one grave were found three human skeletons crowned with diadems of gold plate ornamented with *repoussé* work. Thirteen golden crosses, each cross formed of four laurel-leaves, lay on the bodies. Cylindrical tubes of cobalt glass in the tomb prove that the people of Mycenæ knew this substance. A vase of what we should call Sheffield plate—copper overlaid with silver—hand- and wheel-made pottery, terra-cotta idols of Hera, the cow-goddess, two bronze knives, and some beads made up the funeral furniture.

Another tomb containing the remains of three women showed that the bodies had been laden with jewels and burnt. Plates of gold had been laid under the corpses before the fire was lit ; others covered the bodies. These plates were decorated with wonderful skill in *repoussé* work, the designs including cuttlefish, flowers, a butterfly, a swastika, serpents, leaves, and conventional patterns. There was an enormous number of golden ornaments—butterflies, grasshoppers, griffins, hearts, stags, lion-cubs, cuttlefish, a horse, a dog, swans, eagles, and sphinxes, mostly pierced with three or four holes so that they could be sewn on a garment. Others were brooches. Several flat, square gold plates with scenes or animals cut in (intaglios) had evidently been strung as a necklace. One corpse wore a wonderful golden crown more than 2 feet long, the top edge fringed with thirty-six large leaves, the whole crown covered with *repoussé* designs resembling those on some of the golden plates on which the queens lay. The skull of one of the ladies was still attached to a massive gold crown embossed with a conventional pattern. Three other golden diadems lay in the tomb, rather discoloured by the funeral fire. Besides these there were golden flowers, stars, laurel-leaf crosses, bracelets, a crescent-shaped pendant, elaborate brooches, and two pairs of golden scales most finely made, evidently for ceremony, not use ; also a gold mask for a child, and an immense treasure of amber

and gold ornaments, golden, terra-cotta, and alabaster vases, gold cups, and sceptres with rock-crystal balls. Two gold figures of women with doves on their heads and on either hand may have represented Aphrodite. Beside each queen's head was a copper box filled with wood, and the ground was strewn with small pieces of beaten gold. What a dramatic scene when the torch was put to the pyre of these three queens lying amid their heaped golden treasure!

The remains of five men were found in a tomb immediately below a primitive altar evidently erected in their honour. Once again we find evidence of the almost fabulous wealth of Mycenæ. They were buried in treasure much of which was crushed by the great overhead weight of stone, the foot of the grave being 33 feet below the surface. Five large copper cauldrons like the ones used by the Etruscans for burning incense at their gruesome sepulchral feasts, and similar to the ones which in later days were the handiwork of Celts, stood against the wall. One of these held a hundred gold buttons; near it lay a silver cow's head with gilt horns and a gilt rosette on its forehead, recalling that here was the sacred temple of Hera. Two more cows' heads made of gold plate held between their horns double axes, objects belonging to an older cult. A heap of bronze swords and lances lay near. Three of the bodies had golden masks so different in type, and so little like the conventional idea of heroic beauty, that they must have been hasty likenesses hammered out in thin gold plate by some artist who then fixed them on the face of the corpse. A fourth body had the mask of a lion. Golden bracelets, crowns, breastplates, shoulder-belts, studs, and buttons of gold for the decoration of sword-hilts, goblets and wine-flagons of gold and silver, terra-cotta and alabaster vases, cuttlefish, models of temples in gold, great copper jars and bowls, and many amber beads surrounded and covered the five corpses, three of which faced the west and two the south. The gold buttons and studs numbered hundreds all told. Boars' teeth, evidently for harness- or helmet-decoration, and a pile of stone arrow-heads contrasted

strangely with an elaborate handle to a staff or sceptre, in which a golden dragon with scales of rock-crystal was united to a stem of jessamine-flowers, the space between the petals being filled with crystal. There were two strange objects like models (in alabaster and Egyptian porcelain) of scarves with black fringes, and painted to represent a tartan with white lines. Such material was also painted in Etruscan tombs. These scarves were tied in a noose, and will be found in Knossos when we come to the palace there. Some of the diadems and other precious objects in this grave were so small as to have been fit only for children, and the signet-rings would fit only the fingers of women. Other things of interest found in these Mycenæan tombs were a carved wooden box and stores of food, including many oyster-shells, some not opened. Five tombs in all were discovered full of treasure.

A piece of quadrangular column of red porphyry which Dr Schliemann dug up 3 feet below the surface had an elaborate design cut on it which he describes as low-relief palmettes united by a rectangular middle piece. In the course of excavating the palace of Knossos in Crete Sir Arthur Evans laid bare an architectural fresco supposed to give the plan of the famous Labyrinth, the underground shrine of the double axes. The centre of the design is similar to that cut on this red porphyry column found at Mycenæ.

It may be that legend spoke truth and that a prince of Mycenæ led forth some of his people and came to Italy, and that the worship of the cow-goddess and the remembrance of those kings and queens buried in golden treasure introduced into the mass of tribes eventually known as the Etruscan nation the taste for agriculture and the extravagant richness of burial which seems so foreign to the simplicity of Western European life of that day. The tales of splendour which must have seemed fairy tales and were simple truth, brought thus into Italy, and heard by the Celtic traders, awoke their taste for luxury and for making the precious metals (which in those days included all metals) their servants. The kings in their golden masks, the queens

on their heaped treasure, lay in their rock-hewn tombs till the nineteenth century, sung of by poets, and thought of as the dream people of poetry, familiar to the human race for centuries by song, and now shown to humanity by the skill of the archæologist and excavator, who, following a dream, found reality.

CHAPTER VII

BRONZE AGE II AND I

BEGINNING 2000 B.C.

So much more near than I 'ad known,
So much more great than I 'ad guessed.
RUDYARD KIPLING

THE influence of Greece, Crete, and Egypt is very strong in the metal-working art of the Celtic peoples in the Mediterranean basin. Naturally the Northern countries did not receive the impetus of this genius coming from the East till later. The Northern craftsmen first copied in the newer medium the stone tools they had, and then evolved their own style of ornament and technique, till some stray model brought by chance or trade, or some hint gleaned from a trader, opened to their minds the greater possibilities of metal-working and the beauty of form and ornament.

A bronze brooch found in the Victoria Cave in Yorkshire, and attributed to the fifth century, has a design on it very reminiscent of some of those on the gold plates and studs buried in Mycenæ, and quite foreign to Roman decoration. Brooches, of which the Greeks and Celts were so fond, were unknown in Egypt, Assyria, and Elam, no doubt because of the difference in dress.

The excavation of the great palace of Knossos by Sir Arthur Evans cast a clear light on the advanced civilization of the Cretans in the Bronze Age. Some unknown catastrophe led to the destruction of the palace and its temporary abandonment about 1400 B.C., and though the site was inhabited at a more recent date the palace was never rebuilt in its pristine splendour. Mystery had always hung about the palace of King Minos, the terrifying beast the Minotaur, and the Labyrinth. The accounts passed down, originally by word of mouth, had come to be con-

sidered mere legends, till the patience and zeal of the excavator revealed a palace more wonderful than tongue had told of. It seems likely that the cause of the fall of the kingdom of Minos was the same as the reason for its surprising rise—the growth of empire ; the very force which gives rise to empires by its energy finally pushes too far from its centre, is dissipated, and dies of its very greatness. Crete and the people of the Ægean islands were eventually sneered at and despised by the Greeks who owed to them their civilization. Even in the most glorious days of Greece she could show no building such as the palace of Knossos. It stood upon a low hill overlooking the sea, not far from the modern town of Candia, and had innumerable staircases, corridors provided with light wells, the walls frescoed, and an elaborate and perfect system of drainage installed. On the ground floor was a temple dedicated to a mother-goddess, sometimes represented as entwined with snakes. On some of the temple-walls were cut double axes, and figures are seen pouring libations to them in the frescoes. What the cult of the double axes was remains to us unknown, but it was widespread, for traces of it are found at Mycenæ, models of axes in gold plate being placed in some of the tombs, and axes being carved behind a goddess on a signet ring. We have already mentioned stone axes ceremonially broken in the graves of Gaul, which shows the survival of this ritual, and it is probable that the worship was far older than the days of the glory of the palace of Knossos. The legends of the awe-inspiring Labyrinth no doubt arose from the intricacies of this underground shrine, served in mystery and by rites unknown to the public. The story of the Minotaur, a bull-monster who devoured young people, is explained by the frescoes on the palace-walls, where both boys and girls are shown bull-fighting, and it is known that young captives were brought from subject states and doubtless trained as athletes. It is the frescoes which give us the best idea of Cretan palace-life, a gay life of revels and sports. The women, like those of Etruria, shared the pleasures of the men. Court ladies are painted leaning out of windows or over balconies in

square-cut, low-necked dresses, with many jewels and elaborately curled hair, looking not unlike the Court ladies of our Charles II. The men had long hair too, but wore no rich clothes, only bright-coloured shorts and a necklace. They curled their long hair and twisted it into fantastic knots, had no hats, but are always shown wearing high boots—another similarity with the Etruscans ; and even to-day the Cretans wear much the same sort of footwear. There were priestesses, wearing triply flounced skirts, their hair twisted in coils hardly distinguishable from the snakes with which they wreathed their heads and bodies.

The temple occupied only part of the ground floor and subterranean area of the building. There was also in the palace a sort of council-chamber with a stone throne and benches, the throne being of the style known as Gothic. The queen's apartments included a bathroom with a fresco of fishes. There were great storehouses, in which the jars made for holding wine, oil, or other liquids were still standing. The Cretans were famous for their beautiful pottery, and the palace had storerooms full of jars and vases. One room was filled with a treasure of vases painted with lilies, the flower-stems springing from the foot of the jar and flowering at its greatest circumference. Cretan vases were so beautiful that they were sent as presents to kings, and in the days of Crete's decay as tribute. They are painted in the Egyptian frescoes.

Besides the great palace-shrine of Knossos there was a lovely palace at Phæstos, a royal villa, and a newer palace at Hagia Triada. The towns surrounding the palaces have vanished, perhaps swept away as, no doubt, older towns were when the palaces were built.

Two vases of steatite (a sort of soapstone) found at Hagia Triada, one of which represents a band of revelling peasants with their implements, and the other a warrior with his followers in the presence of a king, are considered to be the finest small pieces of sculpture in the world.

The people of the Mediterranean basin had an elaborate writing, which was partly made up of pictorial signs, of which there were one hundred and thirty-five. They had also two

alphabets, rather resembling hieroglyphics, which have not yet been deciphered.

This civilization, which had its centre in Knossos, is called Minoan after the King Minos who was said to have built the original palace. The art suffered the same fluctuations as other schools, and had its primitive time, its prime, and its slow period of decay, distinguished by a short rococo revival. For purposes of classification the Minoan culture has been divided into three—First, Second, and Third periods—and these again into Early, Middle, and Late stages, and a careful chronology with Egyptian civilization has been worked out. The distinguishing point of Minoan art is the great variety in technique. Unlike the Egyptians, with whom they had much traffic, the Cretans were no formalists, and kept to no artistic conventions. Painting, modelling, and sculpturing for the pure joy of art, through their works they still transmit to us their *joie de vivre*, their love of light, luxury, and athletics. Whether we look at the fresco of the cupbearer, the saffron-gatherer, the bull-fighting boys and girls, or the Court ladies, we catch a glimpse of a life where, if there was danger, there was enjoyment, if there was cruelty there was love of beauty. Life may have been cheap—warriors fought naked with only a shield to protect them, youths and maidens baited bulls for public entertainment—yet the king was no tyrant isolated from his people, but a patron of everything which made life more comfortable and dignified, living in the midst of a joyous Court where men and women were of equal standing. The palace of Knossos gives a vivid picture of the incongruities in the Cretan civilization. There was the gloomy shrine of the double axes beside the well-lit reception halls, the throne-room with its stone Gothic throne, and the most splendid of gaming-boards with rock-crystal bars and blue and white inlaid marguerites for some game now forgotten. Here a queen was lodged in what we are accustomed to call modern luxury, and beneath her windows captive boys and girls from the Caronian Gulf passed to be sacrificed to bulls. The Court ladies gazed in all their splendour from the upper corridors, while in the subterranean rooms their sisters, wreathed in snakes, braved

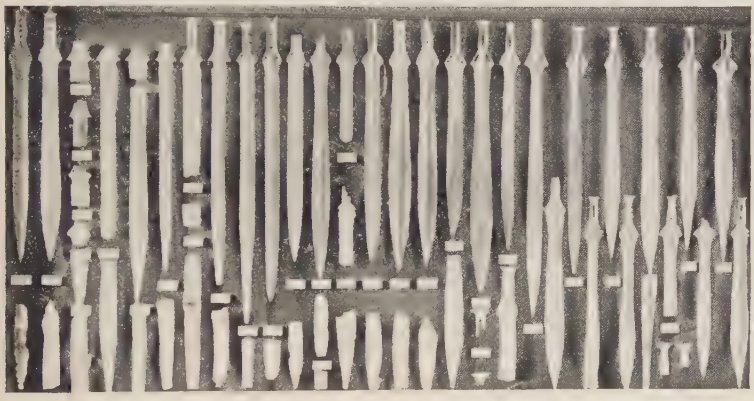
the hidden mysteries. One day some unknown catastrophe swept them all away, and only the tellers of fantastic tales preserved the memory of their dead splendour until the day when the scientific excavator came to rebuild ruined shrines.

The Cretans had much traffic with Egypt, the most civilized of their neighbours, and the one who survived the troublous times which destroyed her more adventurous ally. Legend says that the Cretans ruled over Greece; they certainly brought her civilization and the early knowledge of art. Some say that they ventured as far as Southern Russia by way of the Black Sea. What is certain is that Crete influenced Europe and the Celtic peoples far more than Egypt with its Oriental formalism. The gaiety, the sport, the palaces and fine clothes, the companionship of women—here were things which appealed to the Western mind. The Minoans learned from Egypt the glazing of pottery, and in turn the Egyptians copied Minoan designs when making silver and bronze bowls. Egyptian scarabs dating from 2500 to 2000 B.C. have been found among Minoan remains, and Minoan pottery from 2000 to 1200 B.C. on Egyptian sites, which shows the mutual admiration of each other's art.

The Phœnicians, sea-traders, are said to have founded the port of Cadiz before 1100 B.C.; it was a centre of the tin trade. They journeyed up and down the Mediterranean, carrying the products of one place to another. In one of the tombs of Thebes is a painting showing a merchant ship moored to the quay and landing a mixed cargo, among other things vases of Mycenæ. These were for sale, but other paintings represent the same lovely vases carried by ambassadors as presents to the rulers of Thebes.

Scandinavian archæologists have claimed that the beginning of their Bronze Age was about 1800 B.C., and that copper was worked in their lands at an earlier date. Other scientists place the Scandinavian Bronze Age between the fifteenth and fourth centuries B.C. Exact chronology is an impossibility, but it seems certain that at whatever date the Scandinavian Bronze Age began it was preceded by the British; all agree that metal-working was known in Britain before it reached Scandinavia.

Even in these early days Ireland drew her ideas and inspirations from a different source from the rest of the British Isles. Spain brought her the models she copied, but Britain looked to the North of France, and stood as the goal of that continuous line of traders who crossed the Alpine passes coming from Italy, reaching the head of the Adriatic from Greece and the Cyclades and even farther east, or from the shores of the Baltic. Another stream came to her from



French Swords of Bronze Age

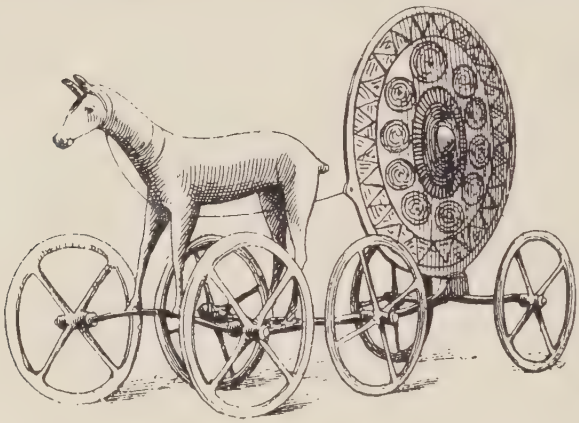
the peoples who used Marseilles as a starting-point and came northward up the valley of the Rhône, avoiding the Alps.

In Denmark the earliest swords are of an Italian pattern, and date from some centuries earlier than 1000 B.C. In Ireland and England some of the early spear-heads resemble those excavated in the second city of Hissarlik (Troy), 2500–2000 B.C. In a barrow at Folkton Wold in Yorkshire three solid chalk drums were buried engraved with conventional designs having eyebrows and eyes similar to those on the owl-head vases of Troy, a design which is really the conventional representation of a human face and may belong to the Copper Age.

In France in the earliest of the Bronze Ages (1850–1550 B.C.) there were triangular daggers, spoon-shaped celts (like those found in the lake-villages of Neolithic days), pins, and bracelets. Sweden and Norway still possess rock-

carvings of their Bronze Age, which give a certain idea of the life. These show that they had large ships without sails, that they were agriculturists, rode and drove horses, and used pictures as a sort of script. They were so far from the centres of Bronze Age civilization that they developed their own style of metal-working and design.

M. Montelius claims that there were five successive stages in the development of the bronze industry among the



The Sun-chariot of Trundholm

Scandinavians. They carried the decoration of their bronze weapons to a high level, using variations of the spiral in their designs. The spiral was a favourite design of the metal-workers of Mycenæ, and as it is found in Hungary, Bohemia, and Germany, but hardly ever in the West of Europe, it seems likely that it came to Scandinavia by the amber route. This spiral of the Scandinavian Bronze Age decoration never reached the British Isles. There are no tin-mines in Scandinavia, so that the people must have relied on traders for their supplies of ore. As well as arms, they made all sorts of objects in bronze. One of the most interesting, found in the peat at Trundholm in the island of Zealand in 1902, is a small six-wheeled bronze chariot, on which was mounted a little horse drawing a disk, one side of which was overlaid with gold, both sides being elaborately decorated

with spiral designs. The horse had been made in a mould; its eyes were of resin, and it had a tail with a socket no doubt meant to hold a tuft of real horsehair. Here was obviously the sun-worshipper's idea of his god drawn across the sky M. Montelius considers that it dates from about 1300 B.C. A fragment of a silver headpiece of pre-Mycenæan times found on the island of Syra close to Delos shows the same design, and points once more to the direction from which the artistic influences came, and shows how long it took for them to penetrate the misty North.

The sun-worshippers believed that by night the sun journeyed in a boat on the ocean surrounding the earth, passing underneath to be ready to mount his chariot waiting in the east. This belief was widespread, the sacred boat appearing on Egyptian monuments, on those of Nineveh, and being mentioned by some of the ancient poets. Scandinavian rock-carvings show boats with sun-disks above them or tied by a string at the stern, the boat-prow often ending in the head of a swan. While in Southern lands the sun-god disported himself on the back of a dolphin, in the North he was seated on a swan or in a car drawn by swans. In the minds of his adorers the swans must have drawn him far through the long Northern winters. Wiser than they knew, they hailed the sun as the god of health, and cut his emblems on the knives which must often have been their sole surgical instruments.

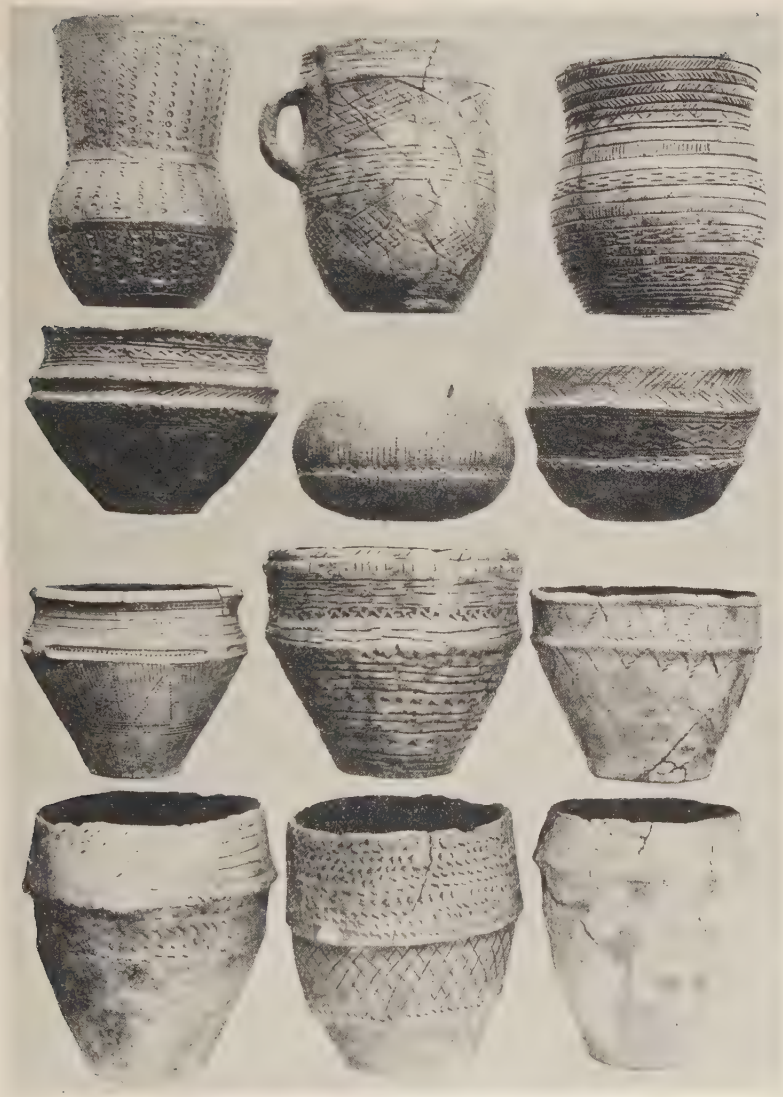
In a sorcerer's tomb near Copenhagen were found two bronze knives ornamented with the heads of horses, and in a little leather box a pierced shell from the Mediterranean, the claw of a bird, the tail of a serpent, the lower jaw of a young squirrel, a scrap of an amber bead, a tiny pair of tweezers, a cube of pine-wood, and the flint point of a javelin covered with a piece of gut. In Jutland a hundred little ships of beaten gold were found buried in a clay jar, doubtless an offering to the divinity, for on the side of each are solar disks. It was apparently customary to offer gold vases and cups to the sun-god, for many have been found in the course of the Scandinavian excavations, and from this habit sprang the legends of griffins, which were satellites of Apollo living in the Far North and guarding untold treasures of gold.

Near the frontier of Italy and France on the Riviera, rather to the north of Ventimiglia, there are four valleys which contain rock-carvings of the Early Bronze Age. These have been studied by Mr Clarence Bicknell. They represent weapons, agricultural implements, heads of oxen, and warriors much smaller than the weapons they are

An Irish Sacramental Dish

wielding. The carvings are on a smaller scale than those in Scandinavia, where in one instance a warrior is more than 2 metres high. Both groups of carvings show men ploughing. Whether they tell some historical event or are part of a forgotten cult we do not know. The rock-carvings of this age in the British Isles have nothing of like interest, being limited to a few circles and rough geometrical designs.

The only other sculptures of this period in Western Europe are on funeral monuments, survivals of the great days of the dolmens and menhirs of Neolithic times. Seven stones were unearthed by a peasant near Spezia, each having on it the



Pottery from Tombs in the British Isles

rough sketch of a human being, the men holding triangular daggers such as were in use in Early Bronze or Late Copper Age times. In the position of their hands and their daggers

these men are not unlike the painted statuettes of warriors of mid-Minoan times.

In pottery in Western Europe the greatest advance of this age is shown in the handles. The preceding pottery had mostly been perforated so that it could be slung by cords passed through the holes. Owing to improvement in the manner of baking, the clay became tougher, and the weight of the jar could be borne by the handles.

In the barrows of Britain, which were the funeral monuments of the day, various kinds of pottery vases were found, but these seem to be connected exclusively with funeral rites. Besides the urns for holding human remains, there are some for storing food and drink for the departed and incense cups with perforated lids. The fashion of stone vases, derived from Egypt, was not popular in the West, though there are a few examples in marble or alabaster found in Spain and Portugal.

Though the countries at the centre of Bronze Age industry produced greater wonders in art, and an infinitely more advanced and luxurious civilization, yet we can see how the cold lands of the North and West drew benefits from Southern riches. The patient, peaceful traders, braving the dangers of the way, brought the tale of distant splendours and a few models of fine workmanship, and who can tell what Northern fancy owes to the stories which the merchant with the painted vases told to the man waiting with his lumps of amber or he to the bearer of tin ore? And how can we know to what humble trader in salt or jade we owe the romances told for many a century? The tales of buried, griffin-guarded gold, of kings and queens smothered in treasure, of dream palaces full of laughter and song, of fierce devouring beasts, and of the deeds of heroes, of beautiful maidens jewel-decked—these must have kept the toilers over the Alpine passes company, have eased their labours; and as the traders passed their heavy burdens to the next nation on the trade-route they passed them too their treasure of stories, the most cosmopolitan and democratic of the types of wealth. Modern science, freeing herself from the tradition of her dry-as-dust ancestry, bursts in with the shout of a glad child, "And it's all true! it's all true!"

CHAPTER VIII

THE COPPER AGE

About 2000–2500 B.C. in Western Europe; 3000 B.C. in Crete; perhaps 4500 B.C. in Egypt and Chaldea

So my Troy did perish.
Shakespeare

COPPER was the first metal to be used by man in many parts of the world; at least, so it seems from the position in which copper objects have been found. Copper, silver, and gold, being found in a natural state, are always the first to be worked. Some people, however, went straight from the use of stone to the use of iron, having neither bronze nor copper stages in the sequence of their tools. The use of metals in early days must always have been decided by the nearest deposits of ore. Small quantities could be brought by traders, but only in districts rich in minerals or on the main route from such a centre could any considerable metal industry be developed. Copper is a much softer metal to work than iron, and it was probably in the endeavour to harden copper that bronze, a mixture of copper and tin, was discovered. Certainly no one would make a weapon of copper if he had iron or knew of bronze. Copper in certain of its forms is found native near the earth's surface, and has a wider distribution than tin, which is a necessity for the production of bronze.

There was no Copper Age for the whole world. It was just here and there that peoples, making the first steps in metal-working, took copper as a substitute for stone, on which they had been accustomed to depend for the manufacture of weapons and tools.

Cyprus, an island in the Eastern Mediterranean, was rich in copper, and may have been the birthplace of the industry in Europe, as it gave its name to the metal. Both Crete and Egypt worked in it, and though there were some mines in

Crete most of the copper may have come from Cyprus. The Egyptians went on using pure copper, but the Cretans very soon preferred bronze. With the exception of Egypt, the continent of Africa had no Copper Age, and resembled in this instance Japan.

The two principal weapons of the copper-working peoples were a flat axe and a triangular dagger, and by following the traces of these copper arms we find that though Cyprus may have been the European cradle of the industry the knowledge was brought from the interior of Asia by way of Chaldea into the Mediterranean district, travelling slowly westward and northward, so that by the time France was reached the knowledge was coming from the Black Sea, as well as from the Ægean islands. The use of copper caused no great revolution, the users continuing to employ stone for most of their needs.

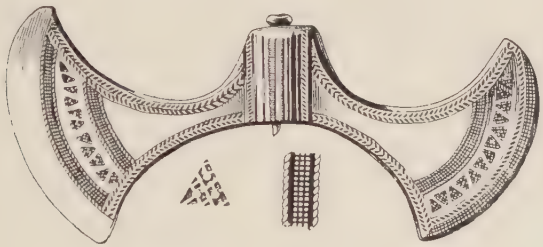
The early copper tools were cast, which argues a certain skill and mental advance, for primitive peoples such as the American Indians did not cast, but merely hammered their copper into the shapes required. It may be that much knowledge was diffused by word of mouth, and that traders from Asia told of the methods used in their own lands, where civilization was more advanced, so that when their hearers found the precious metal they already had an idea of how to treat it. America, not having traffic with other continents, would not reap the experience of more advanced peoples.

Gold was discovered rather earlier than copper, and was equally easy to mine.

Though she had no tin Scandinavia was rich in copper, and developed her own technique in making copper axe-heads. Hungary had many deposits of copper, and exported it to the North-west of Asia Minor and to the North of Europe. This trade brought her new ideas and examples of more advanced metal technique, so that on her borders were found daggers from Cyprus, the double axes of Crete, and axes similar to the ones from Hissarlik and Sardinia. Bronze seems to have reached Hungary about 2000 B.C.

For transportation copper was smelted into blocks with a point at each corner, resembling the skin of a four-legged

animal stretched (' pigs '), or some think a double axe. There is a curious resemblance in shape between these pigs and the so-called ' horned barrows ' of the Bronze Age in Caithness, Scotland. If these blocks were originally supposed to represent the double axe of Knossos and Lydia interesting problems suggest themselves as to the routes taken by peoples and the strange changes to which religious symbols are subject. One of these blocks was found at Enkomi, in Cyprus, in a metal-worker's hoard, and was



Double Axe in Bronze from Hungary

stamped with a sign like an anchor. When the palace at Hagia Triada, in Crete, was excavated nineteen of these same blocks of copper were found ; similar ones have been dug up in Sardinia, others again fished up in the sea, and yet another found in Mycenæ. Most of them had a sign engraved on them, which may have referred to their weight ; two of the signs are the same as signs on the stones of the palace at Phæstos, and a third can be seen on a clay tablet from Hagia Triada. One of these marks is a double axe. The double axe was the national symbol of the deity of the Lydians, and as the invention of gold coins was attributed to them they may have formed the first metal for trading into something resembling their divine symbol.

The pottery of these times in Crete was black, painted with white designs to imitate the earlier incised decoration. This painted pottery was a Cretan invention, and vases of it have been found in the circular graves of Crete and the Mediterranean islands. There were also stone vases, on which the spiral *motif* was used. It may have originally been

suggested by a piece of gold wire ; from that it was used in relief on stone, then on the painted pottery. After that the design began to travel, was used by the Egyptians in the engraving of seals, thence passed to Malta, travelled to Scandinavia *via* Central Europe, and finally reached Britain at a far later date. There are different opinions on this migration of the spiral, some authorities holding that it was a design which most people evolved for themselves at a certain stage of culture.

In the first and second cities of Hissarlik (the site of the classic Troy, which was the sixth town built on the same site) copper was used. The fact that the second city was burnt caused Dr Schliemann to hail it for some time as the Homeric Troy, which was not discovered till three other settlements nearer the surface had been cleared away. Homer's Troy belongs to the Bronze Age when in full strength. But the second and above all the first city of Hissarlik were inhabited before bronze had ousted copper. In the second and burnt city occasional bronze tools were found beside stone ones, showing that it was the time of early experiments in metal. The city had a wall with towers defending it, the early buildings being of unbaked bricks, wood, pounded earth, or stone, and in this city was found what is known as King Priam's Treasure, which included golden and silver vessels. This second city was inhabited by quite a different race from that living in the first Hissarlik ; the civilization had nothing in common with the previous one. The houses and walls were built of huge limestone blocks, the crevices filled in with smaller stones, and even when excavated the city-wall was 10 feet high and $6\frac{1}{2}$ feet thick ; its original height must have been greater. The streets were paved with limestone flags, and the entrance was through gates. The gate-towers were reduced to powder by the great fire which destroyed Homer's later Troy. The towers and walls had been levelled before to make room for the next settlement, but it was the later disaster that reduced them to dust. A stone-built house destroyed by a chance fire contained the skeleton of a girl trapped by the flames ; the fact that her wisdom teeth were

not cut and her other teeth were little worn shows that she was young. The gold beads of her necklace and an electrum brooch lay near her ; she wore a gold ring on one finger and golden earrings.

The houses had wooden floors made of beams, not planks, the crevices filled up with clay, which, being beaten hard, formed a moderately smooth surface. There were copper needles and brooches, jade and stone axes, querns, bruisers, and immense terra-cotta jars, 5 to 6 feet high, placed in store-rooms on the ground floors. Though they were rough it must have needed some skill to bake such huge things, they being 3 to 5 feet in diameter and 2 to 3 inches thick. They were of a fine dark red colour. Some terra-cotta beakers in the shape of animals, such as a sow (the liquid being poured out of the tail), are very like those found in Cyprus. Painted pottery had not reached this city, but many vases with so-called owls' heads were found, made in honour of Athene, patron goddess of Hissarlik, whose sacred bird was the owl, and whose statue was said to have fallen from heaven and indicated the site of the city. Some of the vases were made on a wheel. These so-called owl vases were very numerous in the second city of Troy, as were cow-headed vases at Mycenæ in later days, that town being dedicated to Hera, the cow-goddess.

Copper brooches and needles were found in the earliest two Hissarliks. Of the first city not much is known, but the use of earthenware is remarkable ; every utensil was made of it—urns in which cremated bodies were buried, large jars for storing liquids, all the cooking-pots, great bowls for washing, hooks for hanging clothes, brush-handles, weights for fishing-nets, tiles for the roofs. Some of the jars were hung by a linen cord passed through holes pierced in them ; when the jar had to be closed this cord went through the lid also. The same type of jar has been found in Denmark and in France near the dolmens.

The black pottery of this first city was produced by baking with fuel which made a great deal of smoke ; to give it a lustrous polish the pot was coated with tar or resin before baking. Even idols were made of earthenware, but these

either had no features or they have long since vanished. They had no feet or legs, which peculiarity was supposed to ensure the continual presence of the deity. The idols of this first Hissarlik no doubt represent Athene, and like other religious statues are more curious than beautiful. The adoration of an animal or bird associated with a deity, such as Minerva's owl or Hera's cow, may have been a survival of the time when animals ruled the earth, holding the life and death of humans in their power. The man-god is the most modern of all deities, and it was the genius of Greek art which, grasping perfection in form, first showed to the world that divinity lay not in the grotesque or the horrible, but in the perfection of human beauty.

The shapes of the cups, jars, and goblets were varied; there were pitchers, goblets, two-handled vases, and an urn on three feet containing human ashes and the bones of an embryo. Colour variety in pottery was introduced by dipping the object in red clay before baking, until later days, when, the potter's oven being known, great heat produced the red, highly glazed ware with which we are most familiar.

The inhabitants pounded their grain in mortars with pestles; both of these utensils, made of stone, were found in the ruins, with stone balls for bruising corn, saddle-querns, and millstones such as were found in the Swiss lake-villages of an earlier day. Hammers and axes of different kinds of stone, including thirteen jade axes, were dug up by Dr Schliemann. One of the axes was of white jade, a rare stone. It is an interesting problem how this jade came to Troy; its great toughness would make it much sought after.

These prehistoric people of Hissarlik were not conservative as to material for axe-heads; porphyry, gneiss, blue serpentine, hæmatite—all were pressed into the service. Sometimes the problem of boring these stones proved too much for their patience or their ingenuity, and many half-made tools are found thrown down in the ruins. A very usual tool was a single- or double-edged saw of flint, or a knife of the same material, some of the knives being sharp enough to shave with. These saws and knives seem to have been the only tools made of flint in Hissarlik. A

gilded knife was dug up in the first city, and nails and knives of pure copper, which, as it is harder than modern copper and yet has no alloy of tin in it, may have been from a vein with a natural alloy of rhodium such as Mr Duffield found near Lake Superior. The inhabitants of Hissarlik had not far to go for their metals, for there were mines of gold, silver, and copper in the Troad, and Phrygia, the neighbouring land, was rich in gold, the valley of the Pactolus being celebrated for its golden sands. Tradition says that the discovery of the fusing of metals was made in Phrygia during a forest fire. Needles, awls, and brooches of stone were found in the first city, and knucklebones (astragals), which children have played with and fought over in all centuries.

The other interesting buildings of the Copper Age are tombs. These were carefully built with the roof of the grave-chamber made of overlapping stones to form a cupola. The room was approached by a corridor. This type of grave was early known in Crete, the ones excavated by the Italians at Hagia Triada dating from the Copper Age, as did those called the royal tombs at Isopata, near Knossos. Mycenæ had rather similar monuments, but more elaborately decorated with metal in the Bronze Age. In Spain and Portugal the same idea of a corridor leading to a vaulted chamber, the whole built of stones carefully fitted together, stands architecturally half-way between the tombs of Crete and the megalithic monuments of Western Europe in Neolithic times.

The Copper Age is only a term by which we mark that here and there people were beginning to forsake the sole use of stone, and to look round and experiment with other materials. Discontent with tradition was stirring, and this virtue, which, because it makes for uneasiness, is always being mistaken for a vice, had started man's intelligence on the path which ever urges him to a distant and vague El Dorado. The little copper pins were pointing the way to the empires of the sword and the glory of crowned heads.

CHAPTER IX

THE NEOLITHIC AGE

AT ITS HEIGHT ABOUT 4000 B.C., BUT VARYING GREATLY, SINCE THE NEOLITHIC PEOPLES WERE INVADERS

When all our fathers worshipt stocks and stones.
MILTON

THE Neolithic Age takes its name from the polished stone implements which, before the discovery and employment of metal, were the highest development in technical handicraft which men knew of. This phase is to be found in all civilizations; the palace of Knossos, the cities of Troy, the wonders of Egypt alike rose on the humble settlements of their early peoples in the Neolithic stage of culture. Later glory swept away the remembrance of these lowly beginnings, and it is best to turn to Western Europe, which produced no sudden exotic growth of art or empire, if we wish to realize a little of the life when metal and empires were both unknown.

We find the setting of the Neolithic peoples very familiar. The European climate was much the same as to-day; the animals were those of modern times. In a land where lakes abounded, such as Switzerland, there were large lake-villages, collections of wattle-and-mud thatched houses built on platforms, raised on piles in the shallow water near the lake-edge, and approached by a bridge raised in the same manner. This could be easily defended, and for further protection the inhabitants had rough boats hollowed out of tree-trunks with the help of fire and a stone axe. Most of these lake-villages were finally destroyed by fire, which may not necessarily have been the work of foes, for it would be difficult to put a fire out if once started, and easy for a spark from some domestic hearth to take hold of buildings made of such inflammable materials. Some of the Swiss settlements are farther from the shore than

others, which looks as if land marauders were more to be feared. No doubt the stream of trade, which later was such a torrent, was already a modest trickle in Late Neolithic days, and hungry traders had few scruples.

Some of the Swiss lakes have dried up, a deposit of turf forming on them which has preserved the remains of Neolithic times. Switzerland must have been a thickly popu-

A Lake-dwelling

lated country at this period. Though much has perished during the centuries, the traces of fifty separate villages can be found on the shores of the Lake of Constance and of more than thirty on those of Neuchâtel. These settlements are not all of the same date even when close together. At Estavayer, on the east shore of the Lake of Neuchâtel, are two villages which belong to the Bronze Age, while facing them across the lake is one belonging to true Neolithic times. This happens on many sites, and these villages are studied here rather than in chapters dealing with more recent times because they seem to have been one of the inventions brought to Europe by Neolithic peoples.

There was a very dry spell in 1853, during which the waters of the Lake of Zürich sank, revealing supporting piles for platforms, which first drew the attention of archæologists to this type of Neolithic townlet. The site was carefully studied by Ferdinand Keller, and was of the Stone Age, but a bracelet and a knife of bronze were found among the abundant stone implements—the first appearance of metal among a people ignorant of its use, objects no doubt brought by some trader and counted as great treasures.

The excavation of these sites on lake-shores gives a very complete idea of the life at the time of their habitation. All rubbish was simply thrown into the water, and collected at the foot of the piles on which the house-platform was built: the kitchen refuse, the broken tools and pots, bones of animals which had been picked clean (principally those of the ox, sheep, pig, goat, and dog), weights of looms and of fishing-nets, broken fish-hooks, not to mention the things which had unintentionally slipped from somebody's fingers —the bone needles and hairpins of the women, the awls and harpoons and arrow-heads with which the men were working; all are to be found in the rubbish-heaps below the houses. We know from these valuable dust-heaps that the people stored grain. They had three kinds, wheat, barley, and millet, also water chestnuts, hazel-nuts, walnuts, blackberries, raspberries (of which they made a kind of wine), grapes, dried apples, and pears. Their grains were crushed by hand with a big stone, and from this rough flour they made a kind of bread. They grew flax and wove stuff on their primitive looms, and made fishing-nets. They dressed mostly in skins, which were sewed together with the help of bone needles and sinews of animals or coarse thread.

One of the greatest advances made by Neolithic civilization was the introduction of pottery. The people of this period knew nothing of a potter's wheel, but made quite serviceable pottery, decorated with the help of a twisted cord or a fingernail. This pottery was baked in the open air, and was of very uneven quality. Some of the vases

stood on little feet and were not unlike the vases on feet of the second city of Troy ; some were fitted with cords as well, so that they could be hung. Though in actual date these vases were far more modern than those of the second Troy, yet they belong to the primitive Neolithic civilization in Western Europe, so it is probable that at a certain stage of development all people are apt to choose the same forms and cling to them for some time. The best Neolithic pottery is the oldest in date ; the manufacture deteriorated. In France at Mas d'Azil primitive pottery is found in the layer representing the dawn of the Neolithic period. Belgian authorities claim that certain fragments of pottery, apparently belonging to wide, flat-bottomed bowls, found in the valleys of the Meuse and Lesse are of an earlier civilization than the French Neolithic.

Lake-villages were not confined to Switzerland, but it is the country in which they were most numerous ; there is hardly a lake but can show its settlement. In France they are to be found in the Lakes of Annecy, Clairvaux, and Châlain. In Austria, at Laibach in Carniola, there was a very large village in a bog. In Italy there are pile-dwellings on the borders of Lakes Como, Maggiore, and Varese. And they can be followed across North Europe from Prussia to the crannogs, or artificial islands with earth or stone foundations, in the Scottish or Irish lakes. They were not all occupied nor abandoned at the same time, but the earliest are associated with Neolithic civilizations, others started in Copper or Bronze Ages, and some were still strongholds in what are known in history as the Middle Ages.

Besides the lake-villages there are other Neolithic town-lets of which we have traces. Sometimes a stray house is all that is left of the village ; in other cases we can trace a town perched on a height in a position of natural defence, or one which has had stockades built round it. The houses themselves were always primitive, round or square in shape, with walls and floor of beaten clay. Each house had but one room ; in some parts of France and Germany the kitchen and living-rooms were in separate buildings placed

side by side, ashes and burnt bones and kitchen refuse being found in one with very few implements, and many tools, no charcoal or burnt ash, and no remains of meals such as split bones in the other.

The geographical position of these settlements was determined by the needs of their inhabitants. Neolithic people had first to think of their food-supply, and fish was often a principal article of diet. They had flocks and herds, for it was the great discovery of the domestication of animals, combined with their knowledge of agriculture and the manufacture of pottery, which distinguished them as so immeasurably in advance of earlier peoples. But besides their preference for river-banks, where fish and water for themselves and their animals were easily procured, there was the need for a district where flint was plentiful for the manufacture of tools. So very flourishing colonies are found near flint deposits, from whence the carefully chipped and sometimes polished tools and weapons were carried by traders to those less fortunately placed. Polishing, which was necessary for rock implements, was quite unnecessary for those made of flint, but this fact did not dawn on men for some time, and the peoples of flint-bearing districts, mingling with those from rocky regions, copied their technique.

The forests of Gaul are now more silent; we have left far behind the clanging of unseen forges; the caravans have dwindled, and no one passes carrying a painted vase for some chief. Most of the traffic is by boat, so it is in the river-valleys we must seek, especially in France, so rich in waterways. Some tribes kept to the habits of their ancestors, and instead of constructing villages huddled in caves. One of the finest Neolithic settlements in France is that known as the Camp de Chassey, at a place where the two departments of Saône-et-Loire and Côte-d'Or meet. It is perched high above the river Dheune, and is defended by entrenchments. This camp at Chassey continued to be inhabited down to Roman times, but the great mass of objects found belong to Neolithic days. These include quantities of flint, polished stone, and horn tools and

utensils, as well as pottery, and such a store of flint arrow-heads that they must have been made for exportation.

Some heavy stone tomahawks, rare in other stations, were found at Chassey, and little cups made of stag's-horn. Among the pottery were twin cups such as are known in Cyprus in the Copper Age, and spoons similar to those on that island. Twin cups were found in Spain, which marks the fact that it was the coast-route which was now most favoured by traders. The same sort of spoon has been found in Sicily, Spain, and Bohemia.

We have perpetually to turn to the South-east of Europe to discover the inspiration for pottery. There are decorated vases at Chassey whose prototypes are found in the second Troy or in graves of the Copper Age in Cyprus. Whole tortoiseshells were found there, which tells again of the Southern trade.

To turn to Britain, Glastonbury is the principal lake-village known in England. Though it belongs strictly to the dawn of the Iron Age, in a district which had no copper period in equipment, it is similar to the Swiss settlements—indeed, the Neolithic slipped so gradually into the Iron Age that it is often difficult to find the dividing line. It was Ferdinand Keller's discoveries in the Lake of Zürich which gave the impetus for like research in Britain, and Mr Arthur Bulleid, investigating the swamps of Somersetshire, found the Glastonbury site. This village was built on a foundation of beams, felled trees, rushes, stones, and brushwood placed on peat, the foundation as deep as 5 or 6 feet near the defending palisade, which was formed of upright posts with trees and brushwood twined among them to make a rough lattice-work. The village had on one side a watercourse, and also was partly surrounded by a shallow lake, crossed by a stone-and-clay causeway. The houses had clay floors, and often several had been built in succession on the same site, the layers of clay for the floors and remains of burnt ash from the various hearths being easily distinguished. Except for the metal objects present because of its later date, Glastonbury shows much the same possessions as the Swiss lake-villages : the same rough pottery (though here made on

a wheel), the wooden bowls and mallets, the stone implements of poor workmanship, marking the decay of Neolithic skill, the bone needles and stone querns.

To get a clear idea of the civilization of Neolithic peoples we must turn to their burial monuments, those houses of the dead of which there are much more imposing remains than there are of the houses of the living. There are three principal types: *Allées couvertes* (degenerating in Northern lands into plain stone cists), Dolmens, and Menhirs. To understand them we must try to piece together the fragments of knowledge that we have of the religion of Neolithic times. One thing is certain: however much a civilization, an art, or a culture may be imposed on a primitive people by a more advanced race, humanity is never so primitive that it has not its god or gods. Conquerors may think to impose a religion—they can never do more than graft an exotic shoot on the original stock. All through the ages a certain class of intellectuals has inveighed against the ineradicable quality of popular superstitions, and the root of their irritation is the knowledge that the scheme of life they hold so superior is but upstart, that the national inheritance of thought lies with the simple folk.

The most important stone monuments occur in France, Britain, and Ireland, among those Celtic peoples who, as we have seen, though they saw the wonders of Greece and Egypt, had raised no temples to gods. Symbols are the alphabet of a creed, though they have nothing to do with the origin of religious faith, so we must look for the signs engraved on the stones of tombs to recognize a similarity of creed.

All Northern peoples seem to have a strong instinctive belief in a future life, fostered by centuries of adoration of the sun, which, deserting them so long in winter, sprang up with renewed energy each spring. This very strong belief in personal immortality was not shared by the Greeks or Romans, and the Jews, with their insistence upon one God, were alien to the Celtic mind, which saw God everywhere, and peopled the world with fairies and gnomes and spirits both evil and kindly, who still have a feeble existence in Northern folklore and fairy-tales.

We have been accustomed to think of the standing stones of Great Britain and Ireland, of Stonehenge, and of the impressive alignments and dolmens of Brittany as "something to do with the Druids." It is quite probable that the Celtic peoples owed almost all the technical knowledge which they must have possessed to deal with such huge blocks of stone to this priesthood, whose great schools were in Britain and Ireland, schools which remained practically undisturbed in these countries till they blended with the great abbeys of the Middle Ages. Here lies the clue to the remarkable intellectual superiority of Ireland in early Christian days, and the fact that this superiority was the possession of an alien people teaching an alien philosophy accounts for the extinction of the torch they lit. Human sacrifice has always been associated in the popular mind with Druidism, but human sacrifice is always practised at a certain stage in the development of races, and in Ireland, the chief stronghold of the cult, no traces of human sacrifice can be shown. Druidism coincided with the practice; it is doubtful if it did much to encourage it. The Druids were chief advisers of the kings, and sometimes ruled side by side with them; their principal social strength seems to have lain in this habit of upholding existing authority. In Gaul their influence seems to have been largely educational, and on account of their reputation for justice they acted as judges in disputes. The chief tenet of the faith was the soul's immortality, but that was no new belief to the Celts. Indeed, the Druids seem to have been free of the zeal of the reformer, and it has been said that our lack of exact knowledge of this faith is due to the fact that they were more philosophers than religious enthusiasts, and so never appealed to the mass of the nation. It is said that the nearest approach to their schools in the modern world is to be found in the schools of the lamas in Tibet, where great communities of monks pursue medical, botanical, and natural science and philosophy, undisturbed by a surrounding population grossly ignorant and often practically slaves. In the *Elements of Instruction*, translated from the Welsh of Taliesin, and said to be for the instruction of the lowest grade of Druid, the range of general

knowledge covered is extraordinary. The following are a few of the questions, the answers unfortunately never having been written down: "What is that which decomposes smoke?" "Knowest thou what thou art in the hour of sleep—a mere body, a mere soul, or a secret retreat of light?" "What is that fountain springing up on the covert of darkness, when the reed is white, and the night illuminated by the moon?"

Though we know the history of their decline and final suppression, we do not know where the Druids came from, nor what part of Western Europe they first invaded, nor what upheaval or strange restlessness drove them into a *milieu* so alien to them. The countries where they settled can never have understood their aim; they were saluted with fear, not comprehension, and this attitude was so deep-seated that up to the present time the peoples among whom they lived most, when confronted with monuments whose significance they feel, but cannot explain, say, "They have to do with the Druids," and so account for their ignorance.

The Druids are said to have held mistletoe sacred, and folklore repeats that Balder the sun-god was killed by mistletoe. This worship succeeded that of the hawthorn and rowan, which are in their greatest beauty in May and November, and may point to an increased knowledge of astronomy, shifting the centre of the sun's course from May to June. The many observations which still cling around May Day point to the popular hold of the older cult.

Many nations at one stage of their development have been in the habit of erecting a stone or stones to commemorate an event or a remarkable person. These stone monuments are scattered all over the world. Some have, of course, been destroyed in the passage of centuries, but the strength and persistence of belief in their sanctity is shown by the number still erect in Celtic countries. Stone monuments, as we have said already, are of various kinds: monoliths (from two Greek words meaning 'solitary' and 'stone'), menhirs (from the Cornish and Welsh *maenhir—maen*, 'a stone,' and *hir*, 'long'), cromlechs (from the Gaelic *crom*,

'crooked,' and *leac*—in Welsh *llech*—'flagstone'), dolmens (from the Breton *dol*, 'a table,' and *men*, 'stone').

Besides these erections a stone was sometimes used cere-

A Cornish Menhir

monially, the best known being the Lia Fail, the black stone of Scone, on which the kings of Scotland were crowned, and which now forms the seat of the Coronation chair in Westminster Abbey. The King of the Isles, suppressed when he became the rival of the King of Scotland, was crowned with

one foot in the mark of a footprint cut in a stone, to signify that he would walk in the steps of his fathers. There was a perforated stone, the Stone of Odin, among the standing stones of Stennis, in Orkney, through which men and women passed their hands to plight their troth. The perforated stone was not of course erected for this purpose; it was probably used by priest-astronomers for sighting what is known as a clock-star, or one whose setting announces the approaching sunrise.

Stonehenge is the chief stone monument in Britain, and is known all over the world, being in many respects unique. A circular ditch and earthwork enclose an area nearly 360 feet in diameter. In this area are the stones, forming a circle of about 100 feet in diameter. There is an inner horseshoe of blue stones, five giant doorways of sarsen blocks, an outer circle of blue stones, and an outer circle of sarsen blocks. A broad avenue or causeway, probably bordered by blocks of stone, led to the circles. There were no doubt originally more than five doorways—perhaps they formed a colonnade. The blue stone boulders of primitive rock must have been brought from Wales; a legend tells how the people of the Plain after a great victory over the Welsh carried off their temple and set it up on the Plain. The sarsen is a type of sandstone found on the Plain itself. The pillar stones and lintels, or imposts, have been slightly worked to keep them in position. The pillar stones were found on investigation to be placed in holes cut in the chalk, and then fixed by small stones packed round the base. The method by which such immense blocks of stone were placed in position is unknown, and suggestive of the building of the Pyramids, though without the help of sand, which could be banked and thus made to raise heavy blocks, or formed into inclines down which blocks could be slid, it is hard to see that anything in nature could have helped these wonderful architects.

Stonehenge is usually associated with the transition period between the Bronze and Neolithic cultures, though the blue stone circle is older, and probably Neolithic. We look at one of our chief national monuments and cannot even tell its

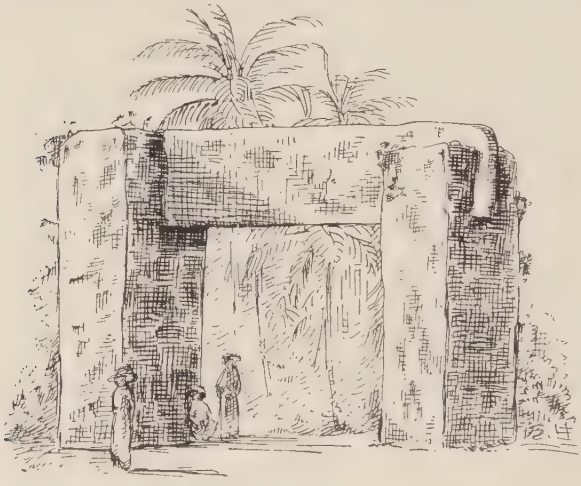
use. It has been hailed as a temple of the sun, as a burial-place, as a memorial to murdered British nobles, as a shrine of Buddha, as a calendar in stone, as a meeting-place for the national army. Nothing of outstanding interest has ever been discovered during excavations of the various barrows near to throw definite light on the mystery of its origin and use. It may be that the Druids brought from their unknown original schools the mechanical knowledge of how to lift great weights, and added the trilithons to the original simple circle of unhewn blocks. In time men who struck the popular imagination—Uther Pendragon, Constantine, etc.—were reported to have been buried at Stonehenge. Many of the stones have fallen down or been carried away for building purposes, but it is now a national monument and carefully watched over and preserved, and is one of the most striking reminders of the shortness of human memory.

Sir Norman Lockyer, in his book *Stonehenge and other British Stone Monuments Astronomically Considered,* holds that all these British standing stones are remains of temples erected for determining the return of the seasons by means of so-called clock-stars, which precede the sunrise on the horizon and so announce the sun's return. He claims that the principal menhirs, and the holed stones such as Odin's Stone at Stennis, were sighting mediums through which certain stars could be watched, so that the moment they touched the horizon preparations to greet the sun could be made. The clock-stars varied, naturally, in different latitudes, and when the passage of centuries altered the position in the firmament of the clock-star subsidiary temples were built near from which more accurate observations could be made. These secondary temples are often seen in Egypt. Sir Norman held that clock-star observations were introduced into Britain about 2300 B.C., and that sun-worship, a more modern cult, reached Stonehenge about 2000 B.C., but that this star-worship was practised at Memphis in 5200 B.C. These dates are based on the position on the horizon of the warning star announcing sunrise when viewed from the sighting stones, and rest on the supposition that the menhirs were sighting stones. If

true this theory would account for the lack of interesting objects found when excavating these sites.

The habit of raising commemorative stones exists to the present day, as witness the endless War memorials. The Hawk Stone at St Madoes in Perthshire was erected to perpetuate the memory of the defeat of the Danes at Luncarty.

Another remarkable megalithic monument is the circle



TRILITHON FROM THE ISLAND OF TONGA
After a painting by Miss C. F. Gordon-Cumming

of Avebury, in Wiltshire. There are two stone circles bounded by a ditch and embankment and approached by what is known as the Kennet Avenue, lined on either side by blocks of stone. Near it is another circle on Hakpen Hill and a barrow on Silbury Hill.

The immense size of the stone monuments of Britain shows the power of whatever sect or class of people erected them and the fact that theirs can have been no fleeting domination. The Britons built with unhewn blocks and not much with flagstones.

In the Deer Park 4 miles east of Sligo, in Ireland, there is another remarkable stone monument as mysterious as

Stonehenge. The entrance is at the south; on the east are two rooms side by side, and on the west one room, two projecting stones suggesting that part was an anteroom. The whole length of the building was 115 feet. The three doorways into the three rooms were of trilithons like those at Stonehenge, but the curious point is that they are not more than 3 feet high. The walls, made of stones which do not touch each other, are never more than 3 feet in height, and often not as much, so that one can easily step over anywhere. This is no tomb, but what it is, whether temple or unfinished monument, we do not know.

The largest menhir in France is at Locmariaquer, in Morbihan, Brittany. It has a Breton name, Mané-er-Hroeck, "Stone of the Fairy," and is of granite, and 67 feet high. Long ago it fell down, perhaps struck by lightning, and in its fall broke into five pieces, four of which lie as they fell. The granite is foreign to the neighbourhood, and the whole is estimated to weigh 342 tons, so some idea can be gained of the prolonged effort needed to bring and erect it. There is one menhir 37 feet high at Plésidy, Côtes-du-Nord, and Brittany can boast the ten tallest menhirs, all of them being over 26 feet in height. The great obelisk of Locmariaquer finds its rivals in Egypt, in the obelisk of Karnak or that of Luxor (now standing in the Place de la Concorde, Paris), both of which are taller. The proof that the ancients knew how to move enormous blocks of stone is to be found at Baalbek, a ruined city of Syria, north-west of Damascus, where a monolith, four times the weight of the one at Locmariaquer, lies cut and waiting in the quarry to be placed in position in the great temple of the sun, now ruined. It is a question whether these impressive stone monuments were always associated with sun-worship and erected by sun-worshippers. The story of the Tower of Babel suggests that the directors of operations, whether Druids or not, in knowledge and speech were foreign to the mass of workmen employed.

There are menhirs in Algeria, Morocco, India, and Central Asia. In Scandinavia they are called "battle-stones," no doubt because used entirely to mark the battle-grounds.

But there is a great difference between placing one stone as a memorial and bringing from a distance and erecting such things as the giant obelisk of Locmariaquer or the circles of Stonehenge or Avebury. Menhirs planted in

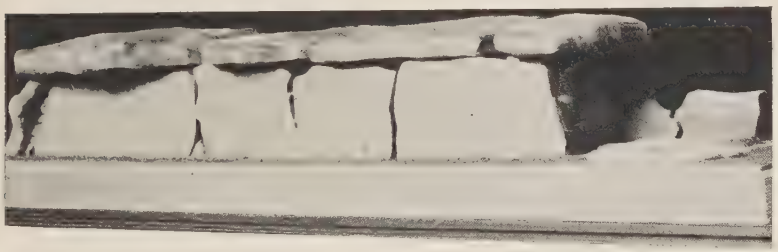
Polished Jadeite Axes from the Dolmen of Mané-er-Hroeck, Locmariaquer, Morbihan

rows or avenues as at Carnac, in Brittany, not far from the great stone of Locmariaquer, are as impressive as their meaning is mysterious. At Carnac these stones extend for more than 3 kilometres, and may possibly have represented an army, or, as some think, marked an enclosure for sacred dances.

When we study the *allées couvertes* built by the Neolithic peoples we are confronted with no mystery. These are

the dwelling-places of the dead. Sir Norman Lockyer, however, has suggested that those near the standing stones and stone circles may have been used as observatories by the astronomer-priests, and that in later days, when a more exact and convenient method of measuring time had been discovered, these observatories were used as burial-places, being sacred ground.

A passage more or less long leads to the grave-chamber or series of chambers. The spirit which drew the living together to dwell in defended villages and prefer a communal life was supposed to be shared by the dead, and we

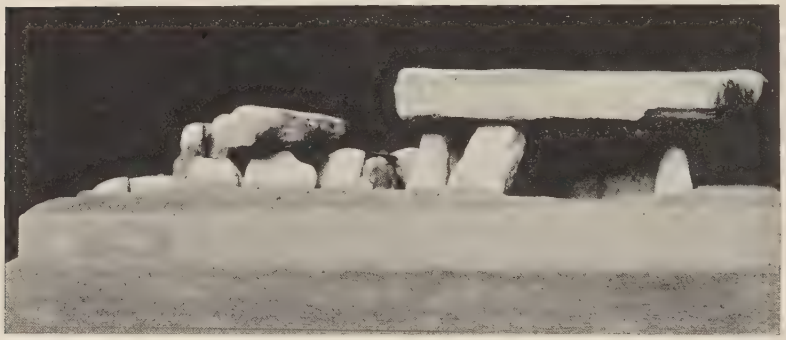


Model of an Allée couverte

are reminded in this instance of the Etruscans in their painted halls. But here is no painting; the builders' object was solidity, to keep inviolate from depredations of animals and men the houses of their dead. These *allées couvertes*, or passage-tombs, could be built only in districts where labour or stone or both were plentiful. In less favoured parts, and in Late Neolithic times, when it may be that, as in all times of change, religious faith was weakening, the dead were buried in plain stone chests, made of slabs fixed in the earth, the ends overlapping, a lid of stone on top. No mortar was used, and earth was heaped round and above them. When this earth happens to have been washed away there remain often the three chief stones, one at the head, one at the foot, and the lid, and these form a dolmen or table-stone. The smoothest sides of the stones are turned inward. There was no fixed rule for the construction of the passage-graves; the chambers to which the corridor led might be square, round, or oblong, and the entrance

might face any point of the compass, though the majority face east. The corridor itself was not always straight. The stone forming the door was often perforated, and geometrical patterns, mostly circles and spirals, cut on the under surface of the stones are the nearest approach to decoration. It must always be remembered that a local supply of stone was the first requisite in dolmen-building; districts lacking suitable rock show no such monuments.

On the island of Gav'rinis ("Island of Goats"), off the



Model of "Cæsar's Table," Locmariaquer, Morbihan

coast of Brittany, there is a large tumulus covering a passage-grave—a corridor of more than 12 metres in length ending in a square room covered by an immense stone more than 4 metres long and 3 wide, another huge stone forming the floor. Both roof and floor had incised patterns of rings and spirals. The fact that the tumulus of Gav'rinis covered a passage-grave was only discovered in 1832, but when opened it was found to have been already raided.

There is a very interesting tomb at New Grange, near Drogheda, Ireland. The tumulus is surrounded by a circle of stones, the actual corridor being 70 feet long, and ending in a vaulted chamber 20 feet high. Two shallow stone basins stand in recesses on either side of the grave-chamber. Most Irish and Andalusian tombs have these basins, which may have been the tables of the dead, biers on which the corpse was placed and lay until a newcomer took the place

of honour, and the bones of the previous occupant were laid with the older tenants of the tomb. The New Grange tomb was built of slabs of various ages, as may be seen from the variety in the styles of engraving and the fact that some of the designs on the earlier slabs have been partially hidden by being built into a later construction, but since the earliest slabs had the incised engraving of Neolithic times it is mentioned here, though three later styles of engraving show that the monument as it stands could not have been complete till the Bronze Age. At New Grange the spiral is used for the elaborate decoration of the stones, and it is strange that in Great Britain the spiral is found only on sculptured stones, rock-surfaces, and balls. The dolmens and passage-graves of Ireland, especially those in Donegal, are most interesting. Central Europe had no rock and therefore no dolmens or stone graves and monuments.

The same sequence of tomb-design, the passage-graves and dolmens declining to simple stone cists, can be traced in Persia and India ; and in studying these various stone monuments we are not merely examining a passing fashion in memorials, we are present at the birth of all modern architecture, and we realize that India does not stand alone, but that her history and development are bound up with that of Europe—they are one, though both Persia and India reached their Iron Age while Europe still lingered in a Neolithic culture.

There were many different methods of burying in Neolithic times. Sometimes the body was coloured red with ochre ; sometimes it was crouching, and must have been originally bandaged or sewn into a skin. In some cases the most fleshy parts were removed, and not much more than the skeleton buried. Certain of the tombs were so short that they could not have held a complete body, and very often the buried person seems to have been done up in a packet and crammed in. In Southern Russia and the Caucasus the dead have been found crouching, with the skulls painted with red ochre. One of the strangest customs was the habit of wearing a bone disk cut from a skull as a mascot ;

it has been proved that some of the dead had one of these disks removed after death, before burial. Much the same operation, known as trepanning, was performed on the living to relieve the pressure caused by a blow, but in these cases there are signs of the wound growing together again and new bone forming. The surgeons of these days must have been skilful, for one remembers that a flint knife would be all that they would have in the way of surgical instruments ; and the patients must have been remarkably strong.

The custom of painting the dead bodies was probably nothing more than imitation of the custom of the living, who seem to have tattooed themselves with peroxide of iron and various shades of ochre, a quarry of these materials worked in Neolithic times having been found at Cornétie, in the department of Dordogne. Tattooing is practised by most people at a certain stage of development. It is seen on many clay idols found in Rumania and in Thrace, and can also be seen on the faces of the very rough idols carved on some of the standing stones, figures which seem to suggest that a mother-goddess guarded the sleeping dead, or more probably were meant for rough portraits of the deceased or a double of the dead person. Palettes for the grinding and mixing of colours, made in a conventionalized human shape and representing the double of the corpse, and clay stamps for the transfer of the design to the body have been found in many parts of the world.

The tools of the Neolithic people, who were still ignorant of metal, were made of stone, and skilfully fashioned. In South Europe the period during which metal was totally unknown to Neolithic people was very short. The two most important tools of this age were stone chisels and axes, which were both chipped and generally polished. Stone lance-heads were shaped like giant leaves, and there were many small, rounded scrapers for preparing skins, as well as awls and variously made very pretty arrow-heads.

Polished stone implements are distinctive of this age, but that does not mean that the process was invariably used. It was usually confined to the manufacture of axes

and tomahawks, for which a great variety of stone was employed. One type of axe had a hole through the centre for fixing a handle, and both ends pointed. Polishing and piercing must have needed much patience when they had to be done by friction and coarse sand, and many half-made tools are picked up, showing that patience failed before the end was reached; these are sometimes found near a big rock used for a polishing stone and bearing grooves suitable for rubbing the tools into shape. Stone mallets had a deep groove down the centre to hold the cord which bound the tool to its handle. These heavy stone tools were not easy to haft, and a bone sheath was used sometimes to join more securely the stone implement to the wooden handle and to give it a little spring. The tools of this age found on the South Downs of Britain are similar to those of the same period found in France, but East Anglia had a rather different technique, and a collection of tools from Essex, Suffolk, and Norfolk shows the varieties.

Neolithic people, even in Europe, which as a rule lagged behind the Eastern countries in such matters, were not without artistic expression. The rock-carvings of the Bronze Age in Scandinavia and the cave-paintings of Spain are two examples. The rock-carvings of Scandinavia are mostly executed on gneiss, a very hard rock on which the scratching of a metal knife makes no impression. The carvings belong to two ages, but the naturalistic animal-studies are considered to be Neolithic or older, the later Bronze Age ones of expeditions setting out in boats being superposed. In Russia, at Lake Onega, there are rather similar engravings on the rocks on the shore. Of earlier date than the Scandinavian ones, the artists may have come *via* Siberia. The designs at Onega include birds, humans, animals, and objects like mirrors and oars, all cut to the depth of a centimetre in the rock.

The paintings of the Neolithic Age in the rock-shelters of Spain are interesting rather than beautiful. There is a great variety of types of conventionalized human beings, some similar to those on a stone at Clonfinlough, in Ireland. What are known as the " Spanish third group " of paintings

are of Neolithic date ; the occasional human figures leading animals by halters stamp them very clearly. The very elementary human forms and the rather distorted animals would seem at the first glance to be the efforts of humanity groping toward the first self-expression in art, but as we continue on our backward journey we shall find that we have been confronted with one of those periodic waves of decadence which invariably engulf a great art renaissance and the first steps toward expressing ideas about things not present or ideas about past and future events, the end of which is writing.

In the study of this age we are hampered by our human weakness for classification. Man has a passion for order and for condensing anything immense so that it can be available for reference within the narrow limits of his mentality. We seize on a stage of development such as the Neolithic Age, note the varied phenomena in different countries, and then become worried because the lake-villages scattered over Europe show such a different mentality and outlook from the equally scattered megalithic monuments, because here and there a bronze bowl or axe seems to upset our fetish of chronology. But the European population of to-day is so densely spread over the Continent, and boundaries of nations, estates, and even cabbage-patches are so carefully delineated, that it is hard to keep in mind the fact that the Neolithic population was distributed more in a series of whirlpools connected by narrow trade-routes, which made it possible for totally different civilizations to prosper and be unknown to each other within a comparatively small area. Community life in Europe was only just beginning ; it may be that the artistic decadence was the result of a lack of that spirit of adventure which plunges into the outside world in search of new ideas and foreign thought. In the Neolithic Age were born what are known as domestic virtues, the stay-at-home, plodding workmen, the good housewives always stooping over a cooking-pot or a loom or tending animals. Then was born the love of the soil, of the village, of the tribe, which produced war and therefore the first army ; art took the form of construction, and even

when approaching the great mystery of death men raised on the surface of the earth miracles of labour which in arresting the eye would divert the mind from vague searchings into the Unseen.

We struggle to class humanity passing through a certain stage of civilization by their use of specific stone implements; we conjure up a procession of men with polished stone axes and lance-heads, and are so keen on the classification of tools that we forget that the users had nothing else in common.

One of the great industries of Neolithic times was flint-mining. The best-known mines in Britain are at Grimes Graves, near Brandon, in Suffolk, and at Cissbury, near Worthing, in Sussex. At Grimes Graves the area mined is 21 acres, and though only two pits have been excavated it is believed that there were 346 pits. The depths of the two pits explored are 30 and 31 feet respectively, and the diameter at the top 30 and 42 feet; the openings narrow in descent to 15 feet. It was found that from the first pit excavated galleries radiated like the spokes of a wheel, the ends of some tapping neighbouring shafts. Between the galleries there were three kinds of communications: open doorways, creep holes, and ventilation holes. Probably each pit communicated with all the other pits. Deer-horn picks were used, and baskets of plaited willows for carrying the flint; four lamps were found. These mines were exploited for a long time; in a cross-section taken remains showed that men of the Romano-British, Iron, Bronze, and Late and Early Neolithic Ages had all worked there.

At Cissbury the shafts varied in depth from 20 to 39 feet according to the tilt of the flint seam and slope of the down. There were the same radiating galleries, but no creep or vent holes. The fact that there were only a few deer-horn picks and that the chalk lamps were of a different type from those at Grimes Graves may point to its being a more modern mine. Some of the shafts in both mines had been used first for dumping rubbish, and then, when partially filled, had been lived in. At Cissbury a man is buried in a half-filled shaft; he lies on his right side facing the east, his knees nearly touching his chin, his body surrounded by blocks of

chalk, a handsomely chipped flint axe in front of his knees, eight shells and a fire-marked pebble with him. The other Neolithic flint-mines known in Britain have pits, but no galleries.

At Spiennes, in Belgium, there is a minefield with twenty-five shafts extending over an area of 60 acres, the surface covered with workshop *débris*. In some parts of the mine the workers cut through the layers of poor flint to reach a good seam. Notches in the side of one shaft may have held wooden beams for a staircase. The height of the galleries here was 5 to 6 feet. No lamps were found at Spiennes.

At Sainte-Gertrude, in Holland, just across the Belgian frontier, is another mine with similar pits, galleries, and deer-horn or flint picks. There are many mines in France, notably at Grand Pressigny (Indre-et-Loire), where there was a distinctive kind of honey-coloured flint traded far and wide by Neolithic man. It was procured in great blocks, from which flakes often as much as 18 inches long were struck off, and the big cores known locally as " pounds of butter " are seen on stone heaps for road-mending till this day. These very heavy stone tools are thought to belong to the stage between the Bronze and Neolithic cultures, and are known as Campignan axes, after Campigny, the type-station.

Deer-horn picks persisted long after Neolithic days, and were especially useful in mining copper, salt, tin, and calcite (used in pottery), and also as a sort of hoe in agriculture. In Spain and Austria they are found alongside copper and bronze picks, hammers, and stone wedges. The mines in these countries were lit by resinous pine torches stuck in lumps of clay. For the transportation of flint in mines skin buckets were used, probably strapped, as are Swiss baskets, to the shoulders of the bearer.

In South Sweden, near Malmö, the chalk in which the flint is embedded having been brought by the ice and deposited between the ground and surface moraines, the flint seam is only from 3 to 10 feet below the surface, and therefore no galleries are needed. At the base of the shafts

are small vaults ; the bases often meet. As the working was exhausted each shaft was filled up.

The chert quarries in Oklahoma, in the United States, show the same design as these European ones ; there were found pits 5 feet deep and 40 feet in diameter, trenches with workshops on the margins and on the dump-heaps, and a deer-horn which might have been a pick. Though the area quarried for flint comprises 100 acres there was neither shaft nor galleries at Hopewell Township, Ohio. Granite and quartzite hammer-stones weighing 25 pounds had been used there. These American mines, though having nothing in common in actual date with the European ones, show that when flint is needed men attack the problem of mining it in much the same way.

We naturally want to know whence came these Neolithic people who, we shall find, knew so much more than their predecessors. It is certain that they had discovered how to domesticate animals, the principles of agriculture, the making of pottery, and the art of weaving before they arrived in Europe. They may have followed blindly that strange instinct which draws peoples westward, and, seeking they knew not what, have found in the lands of the setting sun a new world waiting for its new masters. Perhaps the wish for a quiet pastoral life led them to seek fresh lands and pastures when the discovery of metal drew some men toward conquest, and they left their home, which was probably in Asia, and spread slowly westward, not in an invading host, but gradually filtering through all countries, until in the course of centuries the knowledge they brought spread from the lands round the Mediterranean to the countries of the Northern seas and laid the foundations of what we know as modern civilization.

Scandinavia is the best country in which to study the chronology of the Neolithic Age, for as it was previously covered by a sheet of ice Maglemosian man was the first inhabitant and cannot have arrived more than 12,000 years ago, so that it is with his arrival that all interest in Scandinavia (except geological interest) begins. The melting of the great Scandinavian glacier made various geographical

changes in regions adjoining. What is now the Baltic was then a wide channel, to which is given the name Yoldia Sea, from a certain shell called *Yoldia arctica*, found only in very cold water. At the final disappearance of the ice, owing to the rising of the land at both ends of the Yoldia Sea it became a lake, and is called the Ancylus Lake, after another shell, *Ancylus fluviatilis*, which indicates a rather warmer climate, and it was at this stage that man made his appearance in those regions. The retreat of the ice caused a subsidence in the southern half of Scandinavia, and in place of the Ancylus Lake there was the Littorina Sea, called after *Littorina litorea*, found there in profusion. The climate grew still warmer, there were quantities of oysters, and Neolithic man settled there. In modern times South Scandinavia is slowly but steadily rising.

These Neolithic immigrants camped along the sea-coast, and left to mark their sojourn there what are known as "kitchen middens." They lived greatly on shellfish, and otherwise by hunting, and all their rubbish, the remains of their feasts, the empty oyster and other shells, and some of their very rough tools form long ridges along the coastline which can still be seen to-day. Occasionally a skeleton has been found in the midden, some one buried by his own fireside; and for the first time the bones of dogs, man's oldest friends, are found, though there were no flocks and herds for them to keep. The other remains show that they ate the stag, wild boar, and roe-deer, as well as such birds as gulls, swans, and wild geese. Some Swedish scientists claim that certain rough and very massive tools were made by a race preceding the "kitchen midden" people, but this is a disputed point.

Not only in Scandinavia is this "kitchen midden" civilization found, but in France, Ireland, Portugal, and Sardinia, and also beyond Europe, in Japan and Chili, in Patagonia and North America, in Brazil and Egypt. Wherever it is it marks the first entrance of Neolithic man, soon to establish himself so much more comfortably where he began by camping in his skin tent. The tents were evidently in a continuous row, as is seen by the line of the rubbish-heaps; they

were no solitary pioneers, these invaders, but the far-flung ripples of an advancing human tide. They did not drive out the people they found settled in the countries they reached, but lived beside them for centuries, each adopting customs of the other. Like them we stand on a shore, not of the sea, but of the Neolithic or New Stone Age, and look out over the vast expanse of the Palæolithic or Old Stone Ages, which, wrapped in the mists of centuries, are waiting to be explored.

CHAPTER X

THE LATEST PALÆOLITHIC AGE—MAGLEMOSIAN, TARDENOISEAN, AND AZILIAN ERAS

About 8000–10,000 B.C.

> My thoughts are with the Dead, with them
> I live in long-past years.
>
> Robert Southey

THE Palæolithic or Old Stone Age is divided into two periods, known as the Upper and Lower Palæolithic, between which there is as great a difference in culture as there is between the Neolithic and Palæolithic civilizations. The apparent boundaries between the different periods are likely to disappear as fresh discoveries fill in the gaps in our knowledge, but when we cross the threshold into the Palæolithic period it is quite clear that, though we may find a tool or two bearing some resemblance to those of Neolithic times, we are dealing with people who knew nothing of how to domesticate animals or sow crops, nothing of architecture or the manufacture of pottery. It requires an effort of imagination to picture a world ignorant of all these essentials of modern life. The pursuit of food and shelter turns human existence into one long tussle with climate, one long test of endurance and dexterity.

At this time Western Europe had as inhabitants several different races. One of these peoples came along the shores of the Baltic, which a considerable change of climate had freed of the ice-sheet previously extending from Scandinavia. In those days, the sea being more remote, man could pass on land from Denmark into South Sweden, and it was here, on the western coast of Zealand, near the harbour of Mullerup, that a great settlement of these people was found which gave its name to the civilization they represent—the station of Maglemose, or the Great Bog. This bog was

a lake when what is now the Baltic was also a lake, in Ancylus times, and the Maglemose folk lived on a great raft on the shallow water, their settlement being not unlike the Swiss lake-villages of later days. Owing to the drying up of this lake scientists have been able, by digging in the bog, to get a certain idea of the people's manner of life, but from henceforth there will be many gaps in our knowledge of the details of the various civilizations. There are no more palaces to excavate, no metal objects which, if corroded, still show clearly the level of workmanship reached, no fortified camps to explore ; we must make shift, by the study of chipped stones, of a few skeletons, of a stray carving on bone or stone, and some bone tools, to reconstruct this ancient world in which we are mental explorers.

The people of the Great Bog hunted the moose and stag, the wild cattle and roe-deer, through forests of pine, a tree which is older in Scandinavia than the oak which prevailed in " kitchen midden " times. They had dogs living in their houses which no doubt helped them with their hunting, but when the quarry was brought home and the fires lit for feasting there were no pots in which to cook the meat, for they knew nothing of pottery. The horn and bone of the animals hunted were used to make all sorts of implements, harpoons and fish-hooks, needles and daggers, chisels and awls, spear-points and polishers, and these implements were often decorated with primitive designs or conventional patterns.

A type of harpoon made of stag's-horn is found in Sweden and Denmark in deposits of this age, a type which did not survive, but reappeared in the Swiss lake-villages of Neolithic days. These particular bone harpoons are found in several of the civilizations which form the stepping-stones, as it were, between the real Neolithic and true Palæolithic cultures. Such harpoons have been found below the peat in Yorkshire and in Eastern Russia.

At Maglemose there are flint implements as well, but no sign of polishing on any of them. There are scrapers, stilettos, and picks, and small triangular flints which may have been hafted as harpoons. The settlement at Maglemose

seems to be older than similar settlements in Finland. No skeletons of this race have yet been found. It is probable that the pressure of the incoming Neolithic peoples forced some of the older inhabitants on their route outward, into the less attractive regions, where they lingered until a further surge absorbed or extinguished them, or that, if they remained, they in the course of centuries lost their separate identity.

In an effort to construct a complete sequence in the evolution of stone implements certain types of pygmy tools have been called after their chief place of discovery ; such are the Tardenoisean type. Some authorities speak of the Tardenoisean tools as Early Neolithic, but they seem to belong to a transition stage rather than distinctly to either the New or the Old Stone Age, and so are mentioned here. They take their name from Fère-en-Tardenois, department of Aisne, France, where a great number were found. They are distinguished by the fact that they are so small—in fact, pygmy tools—and triangular or trapeze-shaped. They are usually found on the banks of lakes or rivers or on the seashore, which points to their owners being a seafaring race ; judging from other remains they lived largely on fish. Some of these little tools with two points may have been used as fish-hooks or as barbs in harpoons. These implements continued to be used for a long time.

Such tools were found at Sevenoaks, in Kent, in a tumulus erected after a burial. The body lay on a fireplace, and was covered by tiny worked flints which the fires lit on top had fused. The whole was finally covered with ironstone and sand and more of the small flints. Such tools are found, too, in the rock-shelters and mounds of Gafsa, in North Africa, and in the middens of Mughem, Portugal, Egypt, and Ras Beirut, in Phœnicia, besides other places. The Portuguese middens of Mughem are more than ten miles from the sea nowadays, but it is probable that this is due to geographical changes since their formation. A corruption of the name Gafsa is found when such tools are known as Capsian. The Tardenoisean technique came *via* the Danube in a half-circle to Gafsa.

We follow these tiniest flint tools as if they were a trail in a paper chase through Europe to North Africa, to the Sudan, round the Mediterranean to the Crimea and to India—not that the making of them must necessarily have been limited to one race, but that the need for them and the skill required came at this stage of his development to man.

With the exception of the trapeze-shaped tools, which were lacking in England and confined to the Tardenoisean technique proper, a great variety of implements were known universally by people of this age in Europe, and so the whole culture is usually called Azilio-Tardenoisean, a term uniting the name of a place of most interesting discoveries, Mas d'Azil, in Ariège, with that of Fère-en-Tardenois.

Mas d'Azil is cut through by the river Arise and also by a road. It is in the low slopes of the Pyrenees, about forty miles south-west of Toulouse. M. Piette, who excavated the site from 1887, the work lasting ten years, found in this subterranean gallery remains extending from the Iron Age back into prehistoric times, and certain of the distinctive tools and deposits there have since been known as Azilian. He found flat stag's-horn harpoons with a hole at the base so that they could be attached to a thong, bone stilettos and polishers, no sign of polished stone tools or pottery, but quantities of small, rounded scrapers for cleaning skins and little flint knife-blades. Necklaces of the threaded teeth of deer were found. There were remains of hearths, ashes, and much peroxide of iron. Several skeletons buried there had been coated with this material, and it seems likely that most of the flesh was removed with flint knives before burial. Among the rubbish were the broken bones of bear, wild cat, beaver, stag, pig, elk, roe-deer, and badger, as well as of various kinds of fish and frogs ; this gives some idea of what the people ate.

There was also a very interesting collection of painted pebbles. These pebbles, taken from the Arise, had been painted on one or both sides with red ochre mixed into a paste with fat, the designs being dots, bars, lines, crosses, circles, and fern-leaves. It seems unlikely that they were used as money, since they were so easily made. Dr Obermaier

suggested that they might be very primitive idols; other people have thought that they were the beginnings of an alphabet or a system of counting. Tasmanians are known to have used some type of painted pebbles. Unfortunately,

Reconstructed Magdalenian Arrow-straightener from Mas d'Azil

no samples of these have been preserved, and the race is now extinct.

At Mas d'Azil pecten shells were found in which the ochre and fat had been mixed together, the shells being used for a palette. The painted pebbles may have some resemblance to the churingas of the tribes of Central Australia, which were wooden or stone slabs carved, painted, or engraved with the signs of totems. A totem is an object (in many

cases an animal) which a family or tribe or person recognizes as an outward symbol of an unseen relationship, an idea which is at the base of all religious ceremonies. In the case of a kangaroo totem, the unseen, wandering god may enter the stone carved with his symbol, or a kangaroo, or a tree or rock near the place where his churinga is kept. As a rule, these slabs are kept in a cave in the rocks, and only the initiated see them ; women are not allowed near. This cannot have been the case at Mas d'Azil, since the hearths and remains of meals show that people lived there, but the laws and observances may have been different. In any case, the painted pebbles and the flat stag's-horn harpoons are distinctive of Azilian civilization, more than a thousand of this type of harpoon being found in Mas d'Azil alone.

In the little rock-shelter of La Tourasse, above the Garonne, the same sort of flat harpoon, the same painted pebbles, and the bones of the same animals as at Mas d'Azil were found ; but as well as these there was the tooth of a lion, which may have been killed locally or have been brought by some roving hunter. La Tourasse has very little to show compared with Mas d'Azil. The only domestic animal these people had was the dog, the remains of which are found at La Tourasse, in the middens of Mughem, and at Oban.

In Azilian times in France the climate must have been very damp ; many bogs formed, and great forests covered the land. The rain was so continuous that the animals that before these times had lived in the country and preferred a cold, dry climate were driven northward in search of more congenial conditions.

Leaving France and coming up the west coast of Britain, we find a trace of the Azilian people at Oban, in Argyllshire, Scotland. There, near the seashore, they lived in rock-shelters (four encampments have been discovered) and left their flat harpoons and their painted pebbles to mark their sojourn. At the time of Azilian harpoons in Scotland there were none in Central Europe. Great shell-heaps show us the principal part of the menu of their feasts.

There was plenty of variety—crabs and mussels, oysters and limpets, whelks and scallops, sea-fish, periwinkles, and cockles, besides the roe- and red deer, goat, pig, badger, and otter. They had dogs, but no other domestic animals. The skeleton of a man was found buried in one of the rubbish-heaps ; he was 5 feet 4 inches high, and the shafts of his leg-bones were flattened, either from sitting cross-legged or from strenuous hunting over rough ground. Two skulls of good capacity were found, but as they were on the surface their age cannot be definitely stated.

Another Azilian station was found on the island of Oronsay.

Since Azilian times the coast-line at Oban has risen nearly 30 feet, and so the caves where these people lived are now high above the sea-level. One cave, McArthur's, has been almost completely destroyed for building purposes.

Azilian man was, as far as we know at present, the earliest human resident in Scotland, where the land had been rising ever since the northward retreat of the glaciers. This rise has not been continuous until the present day, there having been a time when coarse gravel containing shell was deposited on top of the peat, before the rise began again. This may have been at the time of the advance of the Alpine glaciers known as the Daun stage, the final effort of the ice to conquer South-western Europe.

The Azilians also lived in Victoria Cave, near Settle, in Yorkshire, England, but before scientists went to explore it rabbits and badgers had been hard at work, and their labours make the dating of any discoveries by stratigraphical method quite hopeless. The cave was pretty continuously inhabited through the ages, and there was a glorious jumble : an Azilian harpoon of reindeer-horn lying with a bone bead of the days of the Roman domination, and the water-worn tooth of a hippopotamus lying in a layer of earth far younger than the bone, and deposited long after the last hippopotamus had vanished from Britain. This cave has produced most interesting finds, and is still being studied.

We have seen from the various burials mentioned that

man must have had some sort of religious belief. When he laid his dead on a hearth and, as sometimes, coated the body in red ochre it showed that he thought the corpse worthy of reverence and that he had probably some idea of a future life.

All through the ages Ofnet, on a small tributary of the Danube, has been a place at which men have lived. The Azilian necklaces of threaded teeth of the deer, the trapeze-shaped flints of Tardenoisean type, are found there beside a strange burial. There are no harpoons and no painted pebbles, but the cave was evidently not a home, but a place of ceremonial, very special interment. Such a weird burial was it that we find it hard to trace the motive which induced it. In a sort of nest filled with red ochre were twenty-seven skulls, all facing the west, the ones in the centre crowded together as if they had been pushed to make room for the outer ones. In a second nest there were six more skulls. Only four of the thirty-three were grown men; the rest were women and children. These people had been beheaded with a sharp flint, and are buried with their ornaments and some flint weapons. The older women had the most ornaments, the men none, and the young women few. The ornaments consisted of teeth and shells threaded into necklaces and crowns. On the skull of one little child hundreds of tiny shells had been laid. There are no signs of the rest of the bodies—they must have been burnt or otherwise disposed of. The interesting point is that these skulls were those of people of various races; they are both long- and broad-headed, and also of an intermediate type. There are specimens of what we call the Alpine race, the true Neolithic people—broad-headed or brachycephalic; others are of what we now know as the Mediterranean race, narrow-headed, with long faces—dolichocephalic. The third type was obtained by a crossing of the two opposite races, with perhaps other admixture. The mystery is, Why this careful burial of people violently killed—in fact, beheaded, for there are the two top vertebræ of the spine showing marks of flint tools still attached to some of the skulls—and evidently not of one tribe or race? Why this construction of red-lined

nests for the ghastly eggs, and the careful provision of ornaments and flints? This can have been no sudden massacre, but some elaborate ritual, a ritual that from the discoveries at Brünn, in Czecho-Slovakia, seems to have been known and practised centuries before Azilian times. If it was a case of plain ritualistic cannibalism how can we explain the tiny shells placed with such care on the little child's skull?

Strange burial-customs were also observed at Mughem, in Portugal, on a tributary of the Tagus. Here were found numerous skeletons of all ages, of both men and women, some crouching, some extended. In some instances the bones had been placed there only after the flesh had decayed, others had been buried immediately, and yet others had had the long bones intentionally broken. No pottery was found in the lower levels, and but little in the upper one. They were a "kitchen midden" race, a variety of the French Cro-Magnons of Reindeer Age.

The burial at Ofnet shows us that a variety of races occupied Europe, much as they do now, but we cannot tell if the long-headed people on the Danube were the same race as those in Southern France, also long-headed. The broad-headed skulls are like those found in France at Grenelle, and in Belgium at Furfooz.

As regards art, the paintings in open rock-shelters in Spain, belonging to what is known as the Eastern Spanish Palæolithic style, were probably made by people who were a branch of the Upper Palæolithic folk of Capsian race. These paintings are found in daylight rock-shelters or on rock-faces, but not in the west or centre of Spain. The majority are found not far from the Mediterranean coast, and represent battle- and hunting-scenes, in which both animals and humans are very vigorously drawn. There is a great similarity between these paintings and those of the Bushmen. The most recent are executed in bright red and orange, most are brownish red, and the oldest are pale red. When any flints are found near the paintings they are of the Capsian type. In the rock-shelter of Minateda, near Agramon, thirteen distinct series of paintings, shown by superposition, can be studied, the conventionalized ones

being the most recent. In the thirteenth layer are all conventionalized paintings, very few of which are Azilian or Neolithic. The Azilians were a people more occupied with making useful than beautiful things, forerunners of the practical Neolithic spirit.

In France the Azilian and Tardenoisean tools are not found in the same settlement, so the two races, with different implements, must have lived side by side, not adopting each other's ideas ; in other countries this strict division of tools does not exist, and everywhere there must have been blending by intermarriage, which modified the shape of the skulls. Life must have been fairly miserable ; the excessive rain had made the caves, man's natural shelter, almost if not quite uninhabitable ; but the human spirit, undaunted by difficulties, impatient of discomfort, threw off the habits of earlier races, and man, with a skin tent, some poorly made and very small flint tools, and a daring which used seas and rivers as his highways rather than a path through dripping forests, set off on his endless search for an earthly Paradise. When the change in climate, by driving away the reindeer and bison, had reduced the food-supply on land Azilian man became a great fisher, and helped out his meals of venison, beef, and horseflesh with every kind of edible he could find in the sea. He was no new race, with a different set of tastes. It was necessity and hard times which changed man's habit and destroyed his art, and though these mounds of shells and clusters of painted pebbles may seem to us uninteresting and rather trivial they represent a human victory over ruthless nature. The red nests of Ofnet show that man had a religion, with ideas about a future life. Perhaps, like the Egyptians, these early men thought their dead went to the land of the setting sun, and so must be coloured red, his flaming tint, an idea which goes with sun-worship. The dead must have their ornaments, their weapons, their food, as much as the living ; humanity even when dead was worthy of reverence. Men had recognized in themselves a divine spark which death could not extinguish.

CHAPTER XI

THE UPPER PALÆOLITHIC AGE—MAGDALENIAN ERA

About 10,000 to 16,000 or 17,000 B.C.

> Even as heavy-curl'd
> Stooping against the wind, a charioteer
> Is snatch'd from out his chariot by the hair
> So shall Time be.
>
> D. G. Rossetti

WE now enter the most interesting stage of Upper Palæolithic times. The Magdalenian people and civilization, which are most easily studied in France, show us a wonderful art and manual dexterity, and a very elaborate religious ritual. They are called after the type-station of La Madeleine, in the department of Dordogne, which will be described later.

By now we have realized that Europe was no cradle of races; the advances in her civilization were brought from other parts of the globe, and if necessary adapted to local conditions. The Magdalenian people belonged partly to the race known as Cro-Magnon, other branches of which we shall come across in future chapters. Cro-Magnon man was a fine type, not very different from some modern types of humanity. He was tall, the man's average height being 6 feet $1\frac{1}{2}$ inches, and some of the skeletons found are considerably taller. His skull was dolichocephalic, long and narrow, but his face broad, the nose thin and long, and the brain-capacity large. The shin-bones were flattened, as was the case with Azilian man at Oban, and probably for the same reasons. The woman of Cro-Magnon race was also well grown, with a brain-capacity larger than that of the average man of to-day.

When we enter the Magdalenian period we find this race already well established in France, where it was destined to execute some of its finest artistic triumphs.

The climate was much drier than in Azilian times. It

was very cold and rather damp during a period when the Alpine glaciers advanced into the plains, till they were 900 metres lower than they are to-day, a period known in the Alps as the Bühl stage. Otherwise it was cold and dry, with bitter winds and a climate resembling that of the Siberian steppes to-day. The bogs had not formed, nor the thick forests. At the end of Magdalenian times a variation in the Alpine glaciers brought the snow-line 600 metres below its present level. This period is known as the Gschnitz. The cold was intense, as can be seen from the fact that reindeer came as far south as Menton and Northern Spain.

The reindeer provided the Magdalenians with most of their food, so much so that the men of this time are sometimes called the Reindeer-hunters and the period the Reindeer Age. Never before or since has Europe seen such a variety of wild animals as existed in Magdalenian times, especially in the latest climatic phase, the damp cold. Besides the herds of reindeer there were a few mammoths and rhinoceroses. Bison and wild cattle, forest and desert horses roamed the plains ; the chamois and ibex came down from the Alps ; there were brown bears and wild boars in the forests, cave-bears in the caves ; beaver, marmots, ptarmigan, grouse, hares, and a few rabbits were all there to fill the larder. Squirrels made their appearance in the trees, with birds from the uplands of Asia. There were some deer of various kinds. In the period of dry, cold winds the saiga antelope and the wild ass came, and the musk-ox and the great Irish elk, *Cervus megaceros*.

In a climate not unlike that in Lapland to-day the people sought for shelter either under overhanging rocks or in the mouths of caves in winter and in tents in summer, and from their points of vantage watched the marvellous procession of animals driven by hunger into Europe. No doubt the Magdalenians themselves discovered France by following their dinner, wild creatures which with the certainty of unspoiled instinct migrated toward the pastures awaiting them.

Not content to be only a hunter, Magdalenian man was an ardent fisher, and invented bone harpoons in the second part of this age. These were of reindeer-horn in the round,

in later days often ornamented with conventional patterns, but in earlier times with a single row of barbs with small teeth. If made of bone instead of reindeer-horn the teeth were smaller, and at the end of the period, when reindeer were scarce, the harpoons began to be made of stag's-horn, and to tend toward the true Azilian type. The Magdalenians had no bows, so when they wished to throw a dart, harpoon,

Harpoons from La Madeleine

or arrow beyond the distance of their own capacity they used throwing-sticks, which they often carved with wonderful skill in some animal form. Eskimos and Australians, Mexicans and Peruvians, use throwing-sticks, and the carvings on bone of the Eskimos are very similar to those of the Magdalenians. Some of the finest art in the carving of bone, deer-horn, and ivory is displayed on what are known as *bâtons de commandement*, whose use is uncertain ; they may have been ceremonial wands, sceptres, arrow-straighteners, or, it has even been suggested, cloak-fasteners. This wand was made of reindeer-horn, a piece being chosen where the

tine branches. A hole was pierced at the widest part, and the artist then covered the surface with carvings, often of horses or other animals. If it was a wand it may have been used by the magician-priests (of whom we shall speak presently) in their mysterious rites. Lance-heads of bone belong to this time, and some of the most delicate bone work is found in Magdalenian needles. These were made of a slip of bone rolled and polished on a block of sandstone, the eye

Needles from La Madeleine and Les Eyzies

pierced by a sharp flint. They are beautifully made, and were used to sew skins together for clothing, people still being ignorant of weaving. The thread used was probably the sinews of reindeer drawn out finely, a thread which the Eskimos and Lapps use to-day. Scissors, pins, stilettos, and what is perhaps a thimble make up the Magdalenian sewing outfit.

Bone appealed more to these people as a working medium than flint. They used small, round flint scrapers in the preparation of skins and flint knife-blades, which with much skill they struck off the nodule of flint with one blow. They had flint screw-drivers for leverage, small toothed harpoons, and tiny awls for piercing the needle-eyes and also for tattooing themselves, for body-painting was in fashion. They also had the idea of making a tool which would serve two uses, so that sometimes a flint knife had a scraper or

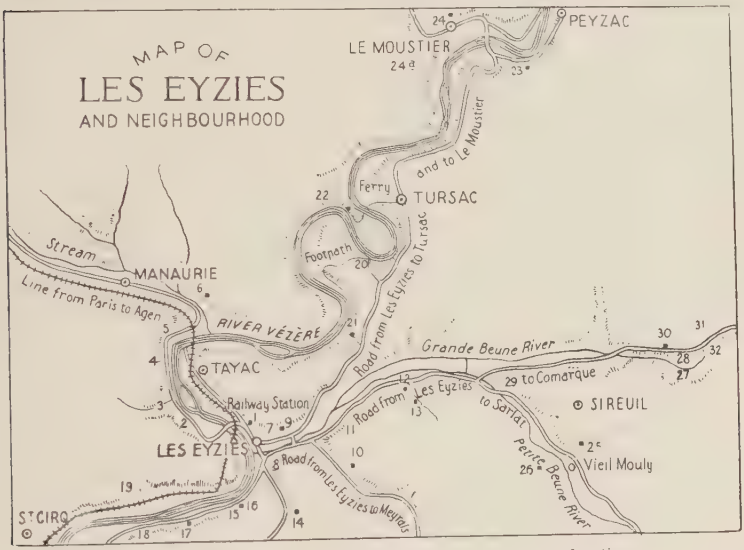
a screw-driver fashioned at one end. There was a distinctive tool called by French scientists a "parrot's beak," from a beaked point at one end which would be useful as a graver, while the rest could serve as a scraper or knife, it being what is known as "retouched" at the side. "Retouch" is a particular technique in the art of flint-chipping. There was also a tool, called by the French a *burin* and in English a graver, of which there were two types, one useful as a screw-driver, the other as a gouge.

The Magdalenians had no pottery, and when they wanted lamps or receptacles for cooking had only stones with a natural hollow in them and probably wood and horn cups, or for cooking they may have tried skin pots carefully sewn, into which, if they held liquid, red-hot stones could be thrown.

These people naturally congregated in those districts where natural caves and overhanging rocks abounded. For this a limestone formation is necessary, and in France their greatest settlements are in the valleys of the Dordogne and the Vézère, in Périgord, where a village called Les Eyzies seems to have been the site of a Magdalenian capital. Here is the type-station of Cro-Magnon, where five skeletons were found, which gave the name to this particular human type—a place which will be described in a future chapter.

The valley in which Les Eyzies stands is bordered on either side by high limestone cliffs, between which the small river Vézère meanders. These cliffs contain many caves of natural formation and many jutting ledges providing shelter for the terraces they overhang. Here in prehistoric days there was no house shortage, and we of the twentieth century can wander at the base of the cliffs and mark the platforms on which the open-air camps were pitched, or, standing on the threshold of the caves, look down on a scene poorer in animal life, but otherwise not very materially changed (if one ignores the modern road) since Magdalenian days. We know the Magdalenians inhabited the caves in winter, for in the remains of deer from their feasts only the young deer had horns—the adult deer were hornless. Adult deer shed their horns each year, and are hornless from November to February.

At Laugerie Basse the little house of M. Maury, who is in charge of the explorations there, is built on just such a natural platform, the overhanging rock forming part of the house-roof. Investigation has revealed the fact that men have lived on this site since Magdalenian times, traces of



The small black squares beside the figures indicate the exact locations

1. Cro-Magnon
2. Roc de Tayac
3. Gorge d'Enfer
4. Laugerie Basse
5. Laugerie Haute
6. La Micoque
7. Les Eyzies
8. Rocher de la Peine
9. Grotte des Eyzies
10. Grotte de Font-de-Gaume
11. Les Girouteaux
12. Grotte Rey
13. Grotte des Combarelles
14. Grotte de La Mouthe
15. Guilhem church
16. Caves near Guilhem church
17. Grotte du Renard
18. Kaolin quarries
19. Fortress of Pech Saint-Sourd
20. Château of Marzac
21. Liveyre
22. La Madeleine
23. La Roque Saint-Christophe
24. Le Moustier
24a. Le Ruth
25. Grotte de Vieil-Mouly
26. Grotte de Bernifal
27. Château of Comarque
28. Cap-Blanc rock-shelter
29. Cazelle halt
30. Grotte de la Grèze
31. Château of Laussel
32. Laussel rock-shelter

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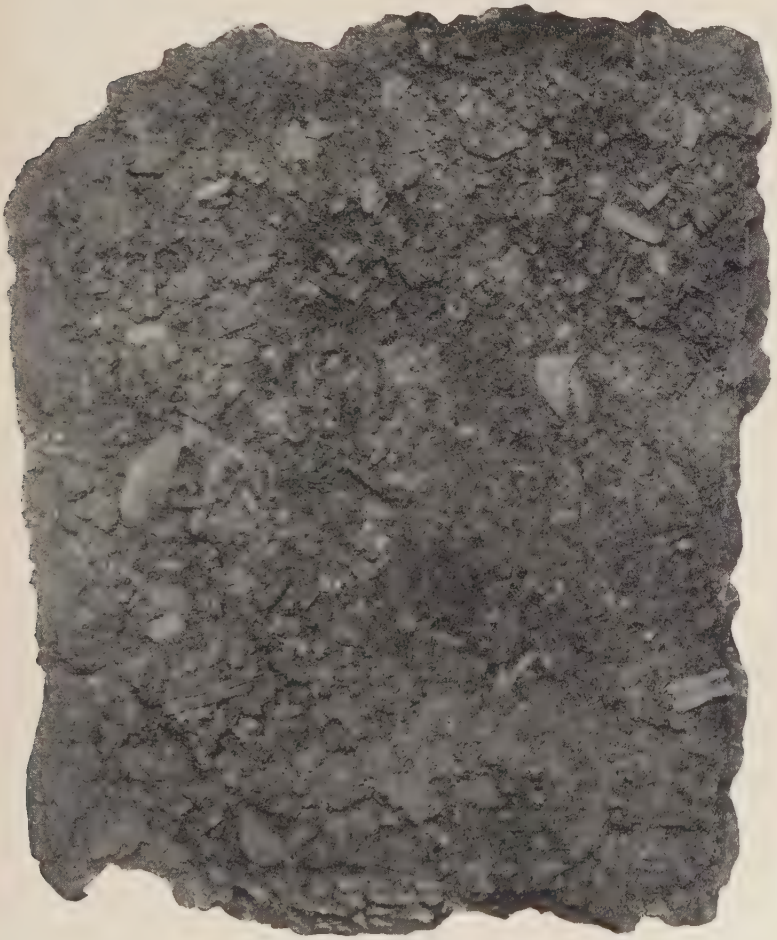
Neolithic, Roman, and medieval occupation linking the people of then and now. Excavations were begun here in 1862, and the site is not yet exhausted. For three years, from 1907, Laugerie Basse was let to a German-Swiss merchant, Otto Hauser, who sold the majority of his finds to Germany, but otherwise the treasures are in the French museums, and a certain number in the British Museum. The rock-shelter of Laugerie Basse owes its origin to the

CHÂTEAU DES EYZIES

From "Reliquiæ Aquitanicæ," by permission of Messrs Williams and Norgate, Ltd.

peculiar geological formation of the rock, in which layers of soft and hard rock alternate, the soft perishing and the hard remaining as overhanging ledges. In the shelter is a clear, never-failing spring of water, which shows that the

Magdalenians were aware of the advantage of water laid on in the house. A certain part has been left unexcavated



Les Eyzies: Portion of Cave-floor with Bones and Implements embedded

to show the different layers of the various ages and their chronology to future generations.

It is a fascinating place, Laugerie Basse. Tiny maidenhair ferns flutter in the rock-crevices. There is a perpetual

tinkle of falling water, protection from wind, and as much sunshine as you want in the front of the shelter. It is well lit, and looks down on the river, the valley stretching for six or seven hundred metres along under the cliff. The whole of this cliff is honeycombed with houses either natural or cut out with a pick—a prehistoric skyscraper, for you have to crane your neck to see the top of the cliff against the blue sky. Ropes and curtains of ivy stain the limestone rock, and a thousand little plants shoot out to the sun, and

Ivory Horse from Lourdes

at dusk, when the cliffs glimmer, ghost-like, above the poplar-edged river, the call of a bird or a rustle will start one's eyes straining to see if the old tenants have come back to their homes.

In this ideal spot, when not hunting reindeer, horse, or wild cattle, or fishing in the Vézère, man employed himself with art. A great many of his carvings and engravings on bone have been dug up here. The subjects were chiefly animals, though there are human figures both male and female, with occasionally conventional designs—perhaps symbolic, or an attempt to express ideas, an early hieroglyph. There was an amusing little salamander carved in the round out of reindeer-horn, and not finished, probably because the piece of horn was not big enough. A throwing-stick ends in the head of a horse with a funny twist in its neck; the heads of two more horses were engraved on the

fragment of a wand, and on another broken piece of bone is a reindeer in full gallop ; this may have been the handle of a bone dagger. Yet another sculptured horse's head was found when digging after the removal of a block of rock which had fallen and thus preserved the site inviolate. The head was cut out in reindeer-horn, and much work

ENGRAVING ON REINDEER-HORN FROM THAYNGEN, SWITZERLAND
Reproduced flat'; the original is on the round.

given to the nostrils. A flat pebble had been used as a block for the engraving of a reindeer which for purity of line can hardly be surpassed ; and there was a plaque of schist on which was a male reindeer following a female, at first wrongly described as the Reindeer Fight. Among the other artistic relics we must cite the Woman and the Reindeer, engraved on reindeer-horn, an ivory female statuette, and an engraving, also on reindeer-horn, known as the Aurochs Hunt, in which a bearded man takes part, crawling up to his prey.

The inhabitants of Laugerie Basse seem to have traded in flint implements, to judge by the number found there. No doubt the fame of the handicraft of this great centre, Les Eyzies, in bone, horn, ivory, and in flint, spread far and wide, bringing eager merchants. The tooth of a mammoth found at Laugerie Basse suggests that they had not far to go for ivory, at any rate during the coldest period of the age.

One of the very few Magdalenian skeletons found was buried at Laugerie Basse under big, fallen, and often crumbled rocks. He lay doubled up on one side, one hand on the side of his head, and the other on his neck, his elbows almost touching his knees ; the body had been bandaged to keep this position. His ornaments were several Mediterranean shells. When first discovered he was described as a man crushed by a fall of rock, scientists then not having acknowledged so early a ceremonial burial. The skeleton was 5 feet 1 inch in height, with a dolichocephalic, well-arched head, and though belonging to the Cro-Magnon race was slightly different in development from those of that race found on the French-Italian Riviera. The principal discrepancy was in the height, which might well have been rather stunted in a less genial climate.

A little farther down the valley from Laugerie Basse is the Gorge d'Enfer, another favourite site for rock-shelters. The biggest, of great extent, has been used in modern times as a restaurant, and, now deserted, presents a rather dilapidated appearance. The *massif* of Laugerie and the Roc de Tayac hem in this little gorge, in which there are many traces of the long residence of man. In medieval times the English, for a time in possession of Périgord, contrived a castle in the rock, with stables for their horses, hollowed-out mangers, and a well sunk to the level of the river.

The district of Les Eyzies is so rich in caves full of carvings and paintings that it is impossible in a book such as this to do more than mention the most wonderful. A little distance beyond the village of Les Eyzies, at the junction of two valleys, one that of the little river called the Beune, is a great mass of rock containing the cave of Font-de-Gaume, which has been lit by electricity and put in charge

of an official guide. This cave has an increasing number of tourist visitors every year. It had been the resort of artists long before Magdalenian days, but a great number of the most interesting paintings were executed in this age. As you wend your way through the narrow galleries, guarding your head from the stalactites hanging from the roof, the whole menagerie of Magdalenian times greets you on the walls. And here we note one of the peculiarities of prehistoric artists, their habit of superposing their pictures, so that in some places there is a real palimpsest on the walls. Perhaps because smooth rock-faces were few and the preparation of them laborious, perhaps from some subtler reason to do with magic, or because these efforts were not intended for pure decoration, engravings are cut on the top of paintings, polychromes are executed over plain silhouettes or animals in dotted outline. This provides a very effective way of studying and correlating the succeeding differences in technique, as obviously the surface works must be the most modern, and from the varieties in animal models an idea of the climatic changes can also be formed. At Font-de-Gaume are paintings of mammoths, their tusks engraved and cutting the earlier paintings. It is evident that the latest artists lived when the cold was great enough to allow the woolly elephant to roam these valleys of the Dordogne district—about midway through the Magdalenian era—or at any rate not very long after its disappearance.

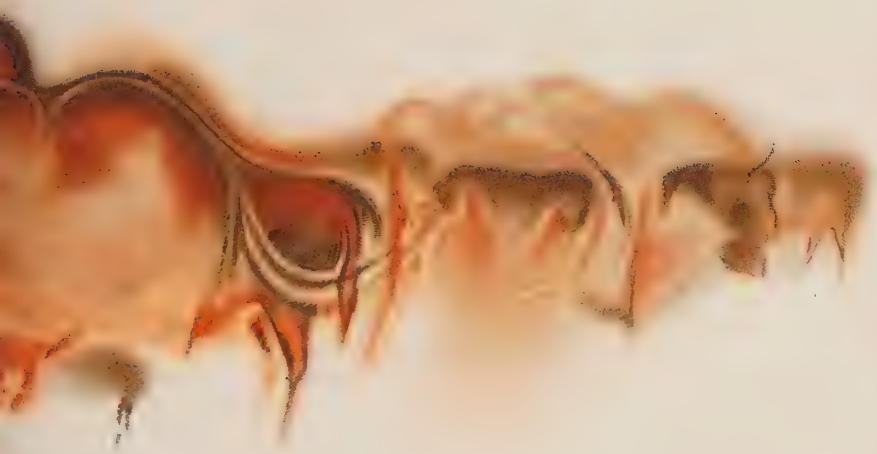
The colours of these early artists were limited in range, being obtained from mineral earths (such as peroxide of iron), ochreous stones, which produced red and shades of orange and yellow, and manganese, which gave black. These colours were mixed with marrow extracted from bones to make them a better medium, and incidentally it is to this fat that we owe the preservation of some of the paintings in very damp caves. If the percolating water removes the colour the outline of the design is still visible by the grease on the wall. In the cave of Niaux, in the Pyrenees, there is an example of this preservation. The colours were kept in hollow bones, stopped up at one end

with clay, which made very passable paint tubes. The palettes were of schist or a large shell; the sketch-books, of which many have been found thrown down below the big pictures, were pebbles smoothed by water or little slabs of flat stone. The engraving tools were flint, and no doubt we should have found paint-brushes had hair been less perishable.

The finest Magdalenian artists flourished in the season of dry cold. In the cave of Font-de-Gaume, after passing a very narrow passage called the Rubicon, the explorer enters the Gallery of Frescoes, where the red walls, being smooth, are covered with a wonderful procession of beautifully painted animals. Mammoths, bisons, reindeer, and horses—mostly half life-size, though one bison measures 9 feet—all follow each other or trample on each other on the walls. Two of the reindeer are grouped, a male licking the head of a female which is lying down, thus introducing composition into early art. A mixture of painting and engraving is used in their presentation.

The mammoths, which in one corner of Font-de-Gaume are engraved on top of all the paintings, have enormously long tusks, which in their great curves unite the procession of elephants in one continuous design. They are shown with very heavy coats. Another group of engravings giving an idea of composition is one where a feline is seen facing a herd of horses as if deciding which one to attack. A horse's head engraved on the body of the aggressor suggests to a casual observer that the dinner may have reached its second course, but the specialists say that this represents an animal knocked down, not eaten. The movement in some of the paintings is wonderful; for instance, in that of a galloping horse of the steppe type, painted in black, shading inward from a thick line which emphasizes the silhouette so as to produce an effect of modelling. Font-de-Gaume gives examples of all the different styles of Magdalenian and the earlier schools of painting, and the skilful blending of red and black lines and red and black paints produces an infinite variety in colour gradation. The cave ends in a very narrow passage, so narrow that it is difficult to walk along it. Near here on the cave-walls

Superposed Mammoths, Bisons, Rei



ND HORSES FROM THE CAVE OF FONT-DE-GAUME, FRANCE

is another form of engraving, made by the cave-bear when blunting his claws to prevent their ingrowing.

A little farther up the same valley of the Beune is another of these great picture-galleries in the cave of Combarelles. Here is no electric light, and one must go candle in hand, and half doubled up, following the guide who lives in the cottage at the entrance. From the moment you enter behind the cottage stable there is an eeriness which perhaps electric light has driven away from Font-de-Gaume. In the

Magdalenian Sculpture: Mammoth from Bruniquel

flickering light of the candles the engravings of bisons, reindeer, bears, ibexes, felines, and a human face dance on the walls—at first in a mere jumble of criss-cross lines, for many are superposed. The gallery is so low that one must sit on the ground when wishing to study the decorations, while the pendants of stalactite and the sharp stalagmites lie in wait everywhere to jab intruding humans. The gallery is 230 metres long, the engravings beginning half-way down, and it ends in a little bottle-necked passage in which one has to lie down and wriggle through feet foremost to see the last group, and hear far below in the dark the sound of water coming from the black gulf where flows an underground stream. Much of the artistic work in both

Reindeer superposed on Horses from the Cave of Font-de-Gaume, France

Font-de-Gaume and Combarelles is covered with a layer of stalagmite deposited through the ages.

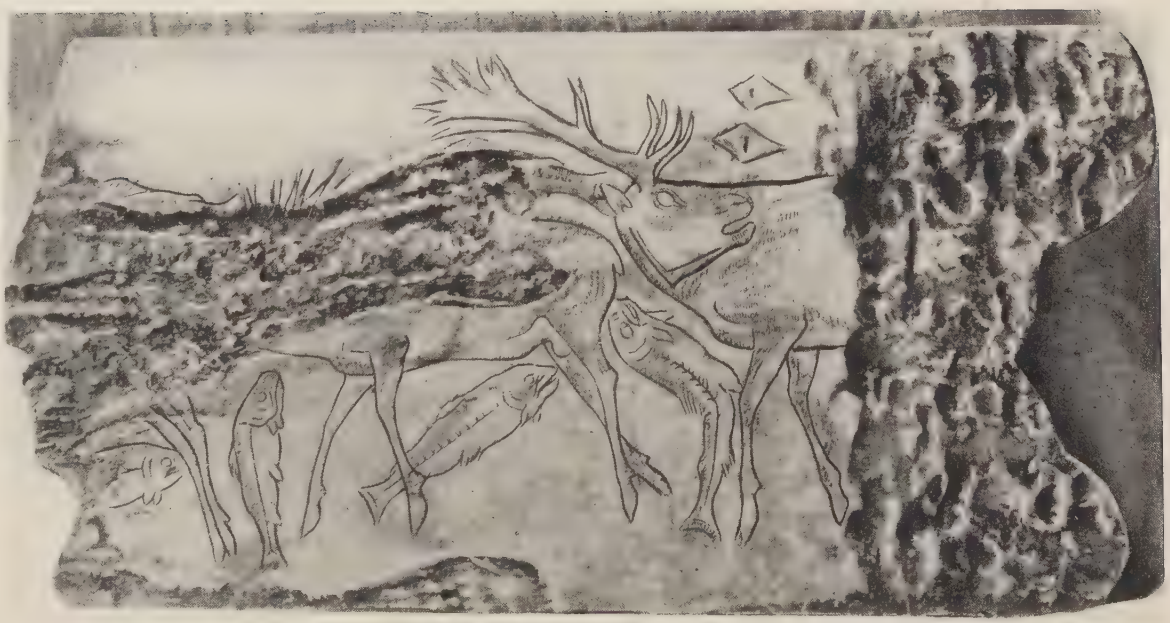
Five miles from Les Eyzies, up the valley of the Beune, in a rock-shelter now protected by a roof, is a frieze of sculptured animals—horses, bisons, and oxen. The six horses are the best executed, one in high relief, with head seen in profile, being especially good. Each horse is about 7 feet in length. Large stone picks such as would be used for carving the frieze were found in the soil below, and at some depth the skeleton of a Cro-Magnon man of Lower Magdalenian age. This shelter, Cap-Blanc by name, had been used by man for some time after this date, so perhaps the buried man was the artist, who had not completed his work when some disaster overtook him, and who died with his tools round him, no one of his successors being able to finish the frieze. A block of stone on which was sculptured a bison was found to have fallen on to one of the hearths when the rock-shelter was discovered, and was removed.

A little downstream from Cap-Blanc is the cave of La Grèze, with engravings of an earlier date.

Facing the Cap-Blanc shelter is the twelfth-century castle of Comarque, built above a cave which can be entered by this way only when the river Beune is sufficiently low. Here once again are engravings and bas-reliefs, a horse's head being the most distinctive. Also near Les Eyzies, up another valley, lies the cave of La Mouthe, the paintings and engravings in which have not yet all been published. They were first discovered by Dr Rivière in 1895; the animals are usually engraved first, and two of them are emphasized by a thick line of paint in black or red.

At Limeuil, where the rivers Vézère and Dordogne meet, what seems to have been a school of either art or magic was found by Dr Rivière and studied by Dr Capitan and the Abbé Bouyssonie. Here were quantities of sketches on stone, mostly of reindeer and horses, some of which had been burnt and afterward intentionally broken.

The type-station of La Madeleine is an open-air camp on the right bank of the river Vézère, sheltered by an overhanging limestone rock and extending for 50 feet. The



RED DEER CROSSING A STREAM, ENGRAVED ON AN ARROW-STRAIGHTENER FROM LORTHET

Magdalenian. Reproduced on the flat; the original is on the round.

river occasionally floods this site, as it did in Magdalenian times, when the people were driven at intervals by the water from their homes. This shows that the rainfall must be similar to-day. Here were found the colours used for painting and tattooing, stone bowls for grinding and mixing colours, beautiful engravings—one specially fine sketch on a scrap of ivory shows a charging mammoth—implements and weapons often highly decorated, and bone needles.

We have no time to describe Bernifal, La Calévie, or the rather more distant Teyjat. We must hurry on to the other great centre of Magdalenian paintings and sculpture, the Pyrenees.

The cave of Niaux is a few miles from Tarascon-sur-Ariège, the entrance on a hillside about a mile from the village of Niaux. In the cave an underground lake which existed in bygone days has dried up, and, rather more than a thousand yards farther on, another lake bars progress except to bathers to-day. From the deposits it is evident that Neolithic people lived at the entrance of the cave, the now dried-up lake no doubt proving both useful and a protection to them in the rear. In the days when artists lived here that lake did not exist ; the shore-line in the gallery is still clearly seen. The action of a stream under the ice had polished the walls of the gallery, thus providing splendid ' canvases ' ; and on the light rock-surfaces horses and bisons painted with mixed manganese and marrow stand out most arrestingly. All the animals are drawn carefully, and some of the bisons are wounded with arrows and darts, showing the methods of the hunters. The pictures are 800 metres from the cave-entrance, and before they are reached there is a collection of incomprehensible signs in red painted on the rock. In another gallery is an ox engraved on the clay floor, circles on the body perhaps implying wounds. Advantage has been taken of natural peculiarities in the rock-face to represent bisons or other animals, the necessary details of head, horns, and body-shading being painted in.

A very interesting cave entered by a subterranean river is that of the Tuc d'Audoubert, near Montesquieu-Avantès,

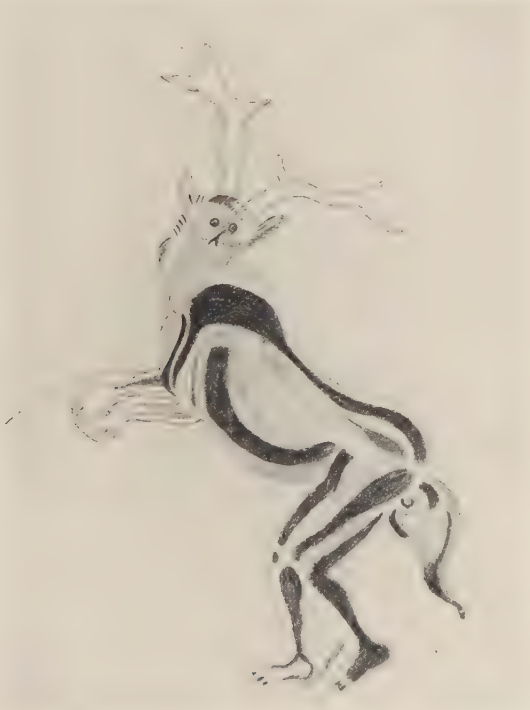
discovered by Count Begouen and his sons. The stream which formed the cavern still flows from it, and the first stage has to be traversed by boat. The cave-passages are hung with stalactites, and a wall shows engravings of the usual horses, bisons, and reindeer. But it is when these engravings are left behind that the real thrill comes. The first modern explorers had to hack their way through stalactites which made a very narrow passage impassable, until, reaching an upper gallery, they were confronted with two superbly modelled figures of bisons, a male and a female, and looking down saw the very footprints of the Magdalenian artists on the clay of the floor ! The cave-bear had also in yet earlier days left his prints on the floor in a place which must have been a favourite haunt, as several specimens were buried there ; the teeth had been extracted from the jaws by hunters of Magdalenian age searching for ornaments. In their search they had dropped some flint implements and the tooth of an ox which had been pierced as a pendant. The bison reliefs owe their preservation to the fact that the gallery in which they are is very damp, though no water is dripping ; they are perfect except for one crack across them. The male is 63, the female 61, centimetres in length. Two more, smaller in size, are sketched on the clay floor, and the artist had begun the modelling of one, the horn being in relief. The material for these reliefs had been scooped from the floor, a little mound being left in the middle, round marks as if made by people jumping on their heels encircling it.

In the cave called Les Trois Frères after its discoverers, the three sons of Count Begouen, there is once again the animal circus engraved as a frieze, but here a strange figure, a man probably the genius of hunting, under whose power are all the painted beasts, with the antlers of a stag, a long beard, pricked, furry ears, hands like bears' paws, human feet, and a tail, dominates the creatures. He is 12 feet above the floor. In one part where the passage narrows lions' masks are engraved on the right side as if to warn intruders.

Another weirdly disguised man with long beard, a horse's

tail, and a horned headdress was engraved on a flat stone in a cave at Lourdes.

We are confronted with strange representations of human beings in the cave of Marsoulas, a cave which was inhabited through several ages. Here are sketches of the heads of



The Sorcerer of the Trois Frères

men, grotesque and rather horrible. These must have been intentional caricatures. The skill which engraved so wonderfully the head and shoulders of a bison in this cave could have been equally used to portray a man, and some hint of the artist's capability to do so may be gleaned from the engraving of a reindeer, bear, and recumbent man found at La Colombière on a piece of mammoth bone. The reindeer and bear by a curious chance suggest part of a woman's figure.

In most of these caves are incomprehensible signs painted in red or black, and classed by the specialists under the name of " tectiforms." Some of them may represent rough huts or tents of skin, or traps in which to catch animals ; others may convey a warning or mark a boundary. According to some authors these are traps, houses, or cages in which to enclose wicked spirits so that they cannot harm the tribe.

On concluding this little mental tour of the chief French Magdalenian picture-galleries we cannot help asking ourselves what was the aim of these artists. It is easy to understand the carving and decoration of tools and utensils, the wish to make individual a weapon used every day, but in the case of the caves the artists did not beautify the entrance, where the people dwelt, so the engravings could not have had the same purpose as our wall-papers. It was not safe to go far in to settle, for a wild beast seeking shelter also might bar the exit. It was the artist who braved the dangers of the narrow, dark corridors, and, with his simple outfit and a lamp of hollowed stone or chalk burning animal grease, penetrated into these dim, mysterious halls and drew on the rock-walls his marvellous portraits of living animals. What human motive was strong enough to induce such effort if it were not the religious instinct ? There were smooth rock-surfaces to be found in the open, where the paintings would have lived long enough to bring the artist fame, and where he could have been the centre of an admiring circle. But no. With his life in his hand, defenceless against a sudden attack when immersed in his art, far from the light of day, in a crushing silence and stillness, this true initiate buried himself alive, to live immortally before the wondering eyes of the twentieth-century explorers. " And why animals ? " we ask. " Can they have been his gods ? " If it be that the artist was the go-between uniting the seen and unseen worlds (the function of the modern priest), why did he spend all his talent on the brute creation ? What does one ask of the unseen powers but plenty, prosperity, and protection for oneself and those nearest and dearest ? The great need of humanity in Magdalenian times was food and warm clothing and safety from attack by wild beasts. The first two

Ox and Bison from the Cave of Altamira, Spain

necessitated good hunting luck, and suppose the animal one most wished to hunt was depicted by an artist true to life on a cave-wall, would not the fact that it was thus imprisoned draw its counterpart to the hunter's vicinity? Added to this, if weapons were painted striking the quarry in a vulnerable spot, would not that also be induced? So reasons sympathetic magic, a deep-seated belief in which can be traced in all races, a belief which is the bedrock of all ritual. After all, it was the animal world which dominated the earth in those days. Man followed where it led, each absorbed in the hunt for food. In the pictures of fantastically garbed men, sorcerers maybe, associated with the animals, and borrowing from them such defences as horns or paws, we may trace the first idea of man's ultimate supremacy, when, remaining himself, he would turn even their protecting attributes to his account.

The Sorcerer of Lourdes

Hunters in primitive races often don the skin of an animal of the kind they are pursuing so as to be unobserved till within close range. No doubt the idea of the devil with horns and a tail can be traced back to these masked sorcerers of the dark caverns, whose superior knowledge and terrifying appearance would strike horror in the hearts of the simple folk, and whose legend would survive their disappearance.

Before leaving France to follow the Magdalenian people farther afield we must retrace our steps to the Dordogne, to the type-station of La Madeleine, which gave its name to this phase of civilization. La Madeleine is near the little hamlet of Tursac, on the bank of the Vézère. If on the Tursac side of the river a ferry-boat takes one across to the site. Here were found the varied types of harpoons

characteristic of Magdalenian times, the reindeer-horn ones with double and single rows of barbs, and the yet earlier bone ones with teeth hardly detached from the main stem. There were many *bâtons de commandement*—arrow-straighteners or sceptres according to the different classifications of this unexplained object—made of reindeer-horn, with a procession of horses or reindeer in single file both above and below the round hole pierced where the tine branched. An interesting sketch of a man with a stick over his shoulder, apparently hunting horses, was found on a broken arrow-straightener.

A human jaw-bone was found at La Madeleine, and is one of the very few human remains definitely of this age. This, the skeleton already mentioned at Laugerie Basse, one found lying on a bed of peroxide of iron in a rock-shelter on the bank of the Beauronne, 7 kilometres from Périgueux, in the commune of Chancelade, and a skeleton ceremonially buried at Les Hôteaux (Ain), from which the flesh had been removed before burial, seem to indicate (as has been noted already) that two distinct types of the Cro-Magnon race were coexistent in France, the more Northern development suggesting an Eskimo type and the Southern a taller race. A striking similarity is seen in North America, where the Eskimo was succeeded in some districts by the tall North American Indian.

There are many other Magdalenian settlements scattered over France, details of which cannot be given in such a short survey as we are attempting.

In Spain, near Santander, there are two interesting caves, those of Altamira and Castillo. The story of the discovery of the cave of Altamira has often been told. A keeper in pursuit of a fox high on the downs above the little village of Santillana del Mar in digging out the fox came on the cave, the entrance to which had been blocked since Quaternary times. He mentioned it to a Spanish nobleman, the Marquis of Sautuola, who, being interested in archæology, made a cross-section trench in the cave-floor, hoping to find something of interest. He took with him his little daughter, aged five, and the child, growing weary of watching her father, walked out of the circle of candlelight, and was heard

Bison superposed on Line-drawings and Hand from the Cave of Castillo, Spain

by him calling "Bulls! bulls!" When the Marquis went to her he found the child sitting on the ground pointing at paintings of bisons and other animals on the roof. The Marquis published an account of these paintings in 1880, but their authenticity was for long denied. The painted ceiling is in a hall so low that a man cannot stand upright. All the animals are very well painted in polychrome, some of them being more than 5 feet long. Once more man has made use of bosses of stalactite to represent bisons in relief in various attitudes.

All the artistic work here is not Magdalenian, some being of earlier date. As well as bisons, stags, hinds, wolves, horses, pigs, ibexes, chamois, oxen, men, and tectiforms are figured; there are no reindeer. There are engravings as well as paintings—one splendid one of a royal stag, and some of hinds in a style peculiar to Altamira and Castillo. A long gallery contains much of the decoration. Fragments of bone incised with a criss-cross conventional design were picked up in the cave. Near the entrance, where a mass of rock had fallen from the roof, were an enormous heap of shells, traces of hearths, and some bones on which animal sketches had been made—notebooks for the big paintings. The human figures wear skins and masks of beasts, and have hands raised, possibly in supplication. Hands are often seen stencilled on the cave-walls; further details of their significance will be given in another chapter.

Castillo, near Puente Viesgo, near Santander, is one of the most interesting caves, having deposits representing a complete sequence of occupation since most remote times to Neolithic days. There are twenty-five layers in all, of which twelve contain remains. Here in the Lower Magdalenian deposit there are a few reindeer-bones and harpoons made of deer-horn. Shoulder-blades had been used as sketch-books, as at Altamira.

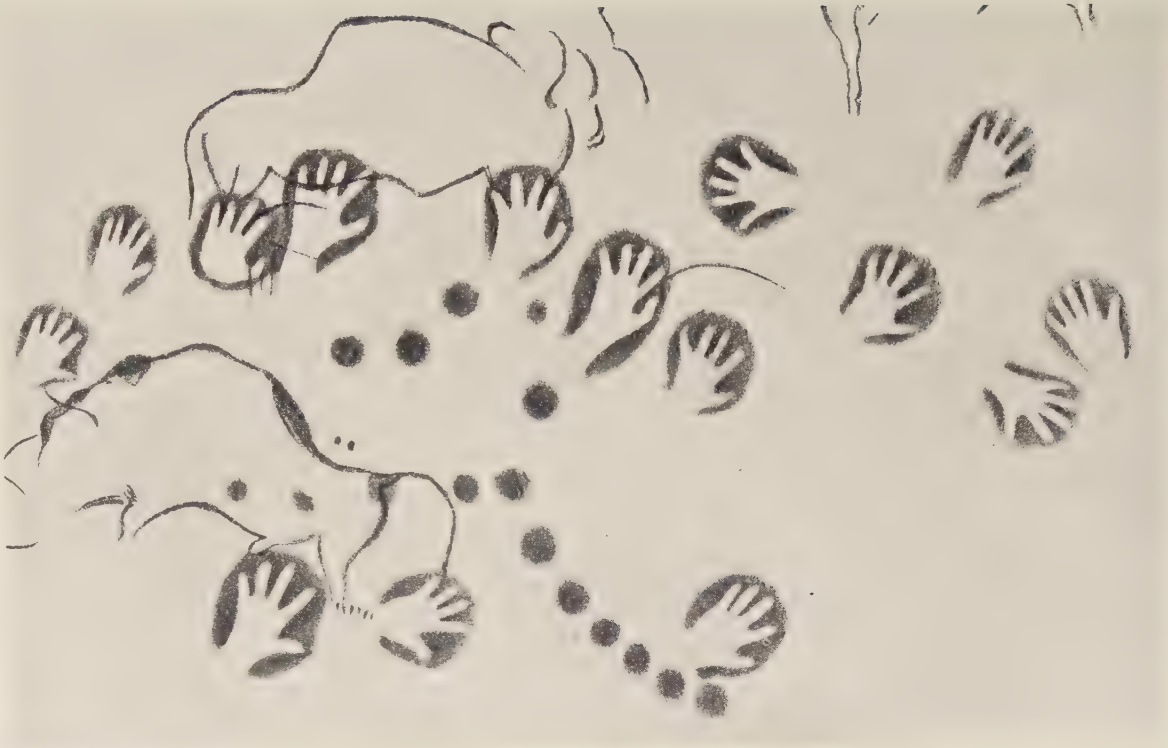
The best paintings and engravings in Castillo belong to an earlier age than the Magdalenian, but there are polychrome bisons, tectiforms, and hands outlined in red belonging to this time. One of the black paintings is that of an Arab horse outlined in black and executed in wash painting,

the shading of the neck and details of the eye and muzzle being most carefully rendered.

During the summers of 1925 and 1926 some caves near Inchnadamph, Sutherland, Scotland, were found to contain

Engraving of Cervus elaphus from the Cave of Altamira, Spain

remains of Palæolithic man. Investigations were made by Mr Cree, Dr Ritchie, and Mr Graham Callander, and two caves were examined. The first cave contained remains of animals still existing and one implement; the second, known as the Reindeer Cave, had two layers with bone deposits. The upper layer showed remains of animals not yet extinct, as well as of bears and parts of two human skeletons, one of which had been formally buried. The lower layer showed



Painted Hands from the Cave of Castillo, Spain

the shed and broken antlers of young reindeer and bones of an Arctic fauna. Judging from the fossilization of the bones and the geological evidence, this deposit is classed as Magdalenian or earlier. In yet another inner cave, the existence of which had been unguessed, were found remains of the great cave-bear, hitherto unknown in Scotland.

The Magdalenian people never frequented the shores of the Mediterranean, but they can be traced in Austria, Poland, England, Belgium, Switzerland, and Germany. Some of their settlements were on the banks of the Danube and the Rhine, and it is probable that they were a development of older races rather than a new race. Their artistic traditions no doubt came from the older Aurignacian artists, of whom we shall speak later. Following down the rivers these people came into Central Europe and into the *cul-de-sac* of Spain. No great mariners, as must have been the Azilians, but a hunting, fishing, artistic race, occupied with the unseen, whose painted shrines heard the life of men pass over them for many centuries, preserving to our day their secrecy inviolate.

CHAPTER XII

THE UPPER PALÆOLITHIC AGE—SOLUTREAN ERA

To 18,000 B.C.

> And East and West, without a breath,
> Mixt their dim lights, like life and death.
>
> TENNYSON

WHEN the Magdalenians came trekking into Western Europe they found a people already settled in many districts, a people who knew little of how to make the beautiful and elegant bone implements in the workmanship of which the Magdalenians excelled, but who were unrivalled in the manufacture of flint weapons. In the working of flint no other race ever attained so high a level of skill. These people are called the Solutreans, after the type-station of Solutré, near Mâcon, Saône-et-Loire, France.

Solutré is an open camp, a fact which points to a change of climate from Magdalenian days; and, indeed, though it was very cold, it was dryer. The actual site of this camp is called the Crot du Charnier, or "the Larder," from the mass of bones found there.

We know that during this age there were great dust-storms, for some of what is called 'loess,' beds of wind-blown sand deposited in the valleys of the Somme, the Rhine, and the Danube, date from this and from earlier times.

The Solutreans did not spread widely over France or North Spain; they hardly left the lower slopes of the Pyrenees in the latter country, and had no fancy for the Mediterranean coast. They were cave-dwellers in winter, tent-dwellers in summer, and they liked the valley of the Dordogne. Their successors and predecessors in these regions were both great artists. The Solutreans put their

remarkable technical ability into the fashioning of lance- and spear-heads like laurel-leaves, darts like willow-leaves,

SOLUTREAN LAUREL-LEAVES

and shouldered arrow-heads. They were a warrior hunting race coming from the East, with no such mental equipment as the Magdalenians possessed.

The reindeer was the principal animal and the favourite food at this time. The mammoth and *Rhinoceros tichorhinus* had not yet left Western Europe for more chilly regions. Wild cattle and bison, stag and brown bear, and a form of antelope called saiga coming from the Steppes—Southern Siberia and South Russia—all varied the meals of these mighty hunters. Mosses and lichens, the reindeer's favourite food, covered tracts which in a more temperate climate would have been grass-land.

The camp of Solutré, the type-station of this age, is 300 feet square, the biggest camp known in Western Europe, and is near a good spring of water. The Solutreans seized rather than selected this site, for it had been occupied by an earlier race, as it was later reoccupied by the Magdalenians. On this sunny slope, backed by the rock of Solutré, 405 metres in height, and facing south, great feasts must have taken place, judging from the charred remains, and a big workshop for flint weapons was established. There were also a good many human remains, and some skulls, but these were of the earlier race, the Aurignacians, of whom we shall treat in the next chapter. No doubt among the burials of all ages found here there are some of Solutrean age, but unless the very distinctive tools of this age are found with the bones no definite statement can be made, since the Solutreans, and the race which preceded them, as well as the Magdalenians, were all three of Cro-Magnon type. The usual method of burial was to place the corpse on a hearth, and in one burial at Solutré the body had been placed there while the embers were still glowing. There were also tombs in open ground made of rough, flat stones, but it is unknown at what time this custom of constructing stone tombs first came into fashion.

As we have said, the Solutreans were chiefly noted for the fine flint weapons they made. M. Lartet discovered a Solutrean settlement at Laugerie Basse, on the banks of the Vézère, in Dordogne, before the camp of Solutré had been found. He was much struck with the similarity between some of the flint implements and those he had seen in Scandinavia. This similarity is occasionally due

to a revival in Neolithic times of great flint-working skill, first seen in Solutrean workshops.

In Late Solutrean deposits bone needles with an eye made their first appearance. Quite a collection of these needles was found at Lacave (Lot), with a carved arrow-straightener. The flint lance-point, the laurel-leaf, was the great weapon of the race, and it was with that that they must have won their conquests, followed and preceded as they were by more highly equipped and superior civilizations. To make these laurel-leaves and the smaller javelin-points known as willow-leaves great skill was displayed, a skill which cropped up again in Neolithic times. A special technique called the Solutrean " pressure retouch " was used in chipping the flint. In this method flakes were pushed off, perhaps by a piece of bone, by pressing outward and downward. Both faces of the laurel-leaved lance-heads were trimmed, the sides were symmetrical, and the head sometimes so thin that it was semi-transparent. The willow-leaf point had only one face trimmed, the other being flat, just the surface of the flint flake of which the weapon was made. Some of the points were cut into a neck at the hafting, which made them easier to attach.

There were what are called " shouldered points," like arrow-heads of flint ; they were worked on one face, with a raised stem down the centre, and had a very acute notch, usually on the right-hand side, reducing the flint to half its width, which would make the lashing of it to a wooden rod an easy affair. There were knives and scrapers, and a blade or flake notched at the tip on either side, leaving an acute point between ; in some cases this was done at both ends, making a tool which could be used as a gimlet or like a screw-driver, for many purposes. The Northern Hungarian Solutreans were less clever at making flint knives, and better at javelin-points.

At Volgu, in the commune of Rigny (Saône-et-Loire), a collection of wonderful laurel-leaf points was dug up by labourers. These are the most beautifully made of Solutrean flints, so perfectly made and so thin that they must have been more for show-pieces or votive offerings than for use.

They were all together in a *cache*, fourteen in number. Some were broken by the workmen's tools (they were digging a canal), but still they remain unrivalled as examples of Solutrean skill.

At Le Placard, a well-known cave near Rochebertier (Charente), beneath Neolithic and Magdalenian deposits were two distinct Solutrean layers, the top one with thousands of shouldered points and a few small laurel-leaf spear-heads, the lower with a great many laurel-leaves, but no shouldered points. There were also scrapers and piercers of flint, bodkins and notched points in bone, and fragments of black and red ochre, probably for tattooing. Solutrean shouldered points were also found in the cave of Altamira.

At Předmost, a small village in a pass leading from the plains of Moravia to those of Poland and Silesia, there were rock-shelters and suitable places for open-air camps under the cliffs. This site was occupied by mammoth-hunters long before Western European Solutrean days, and continued as a camp long after ; in fact, it must always have been more or less frequented. The remains of mammoths are so numerous that at one camp they have been estimated at nine hundred specimens, and are of all ages, from new-born calves to leaders of the herd. The bones of animals of all kinds were so massed together that the soil was most valuable, being sold for fertilizing. A very few laurel-leaf flints of a heavy type were found here, made with the Solutrean retouch, but the majority of implements and remains belonged to an earlier civilization and will be dealt with in a subsequent chapter.

There was not very much artistic activity in Solutrean times. Two stone reindeer covered with little punctuations and some animals cut out of blocks of chalk at Solutré, the head of an antelope engraved on a fragment of reindeer-horn at Lacave, a bas-relief of cattle on a block of stone found at Bourdeilles by M. Peyrony, and a few wall-engravings are the chief efforts in this line that we know of. The people had a taste for personal ornaments ; ivory rings and a bracelet in the Grotte du Placard (Charente) show

skill as well as taste. They were cut from the base of a mammoth's tusk, which is hollow; one ring was in the rough, the other decorated with continuous little notches. A carved hairpin made of a reindeer's rib was also found. Most of the personal ornaments were the pierced teeth of animals and bone or ivory pendants.

The Solutreans did not dominate for very long the regions of Western Europe to which they penetrated. They probably were not very numerous, and had no taste for mountain country. The Pyrenees and the Alps were to them very effective barriers. Traces of their passage are found in Belgium and Britain, but plains over which the reindeer and other animals roam were their favourite hunting-grounds and sunny slopes under overhanging cliffs their favourite camping-grounds. Living the active, nomadic lives of hunters, plagued by dust-storms and by bitter winds, their skill turned to the making of weapons. The habit of living in big communities was not for them. They had a creed, and buried their dead on the hearths under a heap of the kitchen refuse. They occasionally drew in outline an animal they pursued, or cut one out of chalk or bone, but, generally speaking, either they did not care for art or else the need of food and the fact that the principal produce for the larder was fleet of foot made life one long pursuit.

Of medium height, tattooed in red and yellow, a necklace of teeth showing his hunting prowess, the Solutrean man of the Reindeer Age came from East-central Europe, heralded by the icy steppe wind. The type living in the Solutrean settlements of France and North Spain was a mixture of the Solutreans of Hungary and the Aurignacians, an early people already settled in these Western lands before the Solutrean invasion. The great skill in flint-working was probably the fruit of many experiments in his westward progress. Few in numbers, wandering far from their original home, but never lured by the South, this race was submerged, absorbed no doubt by other more dominant peoples.

CHAPTER XIII

THE UPPER PALÆOLITHIC AGE—AURIGNACIAN ERA

18,000–25,000 B.C.

> It pleases us to stare
> At the far show
> Of unbelievable years and shapes that flit,
> In our own likeness, on the edge of it.
>
> RUDYARD KIPLING

THE Aurignacian era is the first stage in the Upper Palæolithic Age. It is the first great civilization with which we have to deal, brought to Europe by the earliest of the Cro-Magnon men.

The Magdalenians, Solutreans, and Aurignacians, though differing widely in so many respects, and superseding each other, were all partly of Cro-Magnon race. This was the first race of the same human type as ourselves, and they seem to have originally made their way along the North African coast, possibly from Asia Minor by way of the Crimea and also Greece, some to Spain and others to Italy, and so into Western Europe.

The peoples arrived at a time of distinct amelioration, in the middle of the fourth glaciation. The icefields had retreated a little. Though the cold was still extreme, the climate was dryer. There were dust-storms such as continued in Solutrean times; all through Aurignacian days the wind-blown sand deposit known as the 'newer loess' was being laid down in certain parts of Europe. European geography was very different from what it is to-day. England and France were connected, England and Ireland also. There was a chain of lakes in what is now the Irish Channel, and what is now the Baltic Sea was then a big freshwater lake formed by a rise in the Scandinavian land-level. Scotland shared this rise in level, and, freed partly from the ice, her forests increased and covered the low-lands.

There was an immense variety of animals in Europe: mammoths, woolly rhinoceroses, reindeer, wild horses, asses and cattle, bisons, giant deer, roe-buck, musk-oxen, stags, brown bears, Arctic foxes, and various kinds of lemmings. The lemming is an animal to be found only in a cold steppe climate, and in Early Aurignacian days the lemmings lived in the caves on the banks of the Danube; by Solutrean days these lovers of Arctic conditions were moving northward. There was a huge rhinoceros, *Elasmotherium sibericum*, with a single horn, which appeared in Europe from the plains of Central Asia. The giant deer disappeared in Late Aurignacian times, but its remains were found in Early Aurignacian deposits in South Germany and South France. A great wealth of teeth, bones, and antlers of animals of this age is to be found in the Dogger Bank, thus showing that there was then a land connexion where is now the North Sea; they are deposited in such a way as to indicate that they were sifted into position by a river. Fishermen of Yarmouth have brought hundreds of specimens up in their dredgers, representing all the animals mentioned. Mammoths, reindeer, and wild horses were the chief animals hunted. The wild horses, of which such an immense number of bones were found at the camp of Solutré, were a forest type of pony with long teeth and heavy hoofs and joints. No one seems to have thought of breeding or breaking them. At Solutré the remains of bones had been deposited in a thick layer with a sort of chalky sand, and it is estimated that there are not less than a hundred thousand individuals here, most of them from four to seven years of age. The bones were split to extract the marrow and bore traces of fire; they were so numerous that they were sometimes piled up to form miniature walls round the hearths, and were associated with implements of Upper Aurignacian technique.

There is now none of the familiarity we felt in dealing with Neolithic Europe. The Europe of Aurignacian man is different in nearly every respect from the continent we know so well. The great geographical differences already mentioned were responsible for the dry cold and the dust-

storms. We have only to glance at the list of the animals to see how many are extinct, or to be found only in very distant parts of the globe. The woolly elephant and rhinoceros, the cave-bear, cave-hyena, aurochs, and giant deer have all vanished. We have no reindeer roaming our forests, and the passage of centuries and the experiments of man in cross-breeding have produced a very different kind of horse from that which the Aurignacians hunted so energetically.

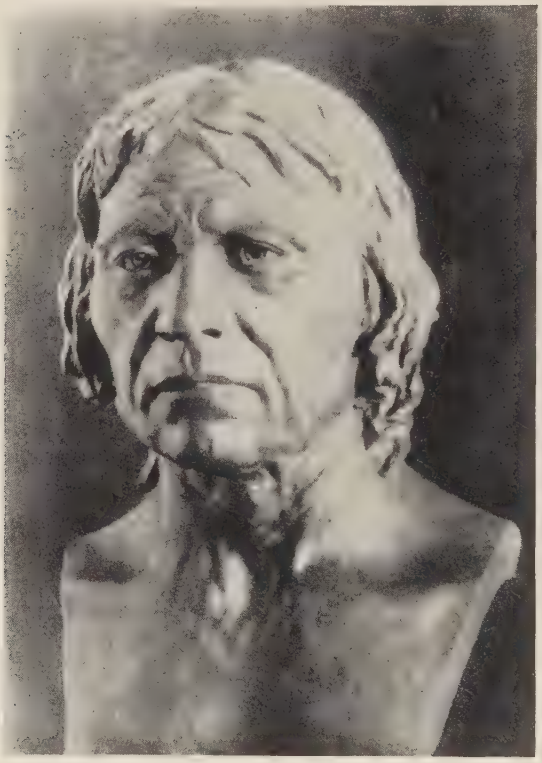
The Aurignacian people and culture are called after the rock-shelter of Aurignac (Haute-Garonne). It was the Abbé Breuil who in 1906 at an International Congress at Monaco first pointed out the stratigraphical position and the chief characteristics of this first period of the Upper Palæolithic Age.

The grotto of Aurignac had been discovered in 1852, when a series of Neolithic burials and the hearths of earlier races were noted. In this grotto there were found at least seventeen Neolithic skeletons, of both sexes and all ages, but at this date, nothing being known of the scientific interest of these early races, the Mayor of Aurignac ordered the bones to be removed to the cemetery and there buried; so that in 1860, when M. Lartet came to examine and classify, they were for ever lost.

The Aurignacians were distinguished from preceding races by their systematic use of bone for well-worked implements and a great variety in their flint tools. Physically they were a much finer type than any of the earlier people—so much finer that it was as if a new creation had burst upon Europe; they had nothing in common with the earlier settlers. As we have said, they belonged principally to the Cro-Magnon race, a race in which the height-average of the men was six feet, many individuals far surpassing it, and in which the women had a brain-capacity greater than the average man of to-day. They arrived by way of North Africa, but whether from the South or from the East originally we do not know; and they brought with them great technical skill in bone- and flint-working, an advanced and beautiful art, and an elaborate ritual, shown in their

burial customs. To the previous inhabitants of Europe they must have been as gods.

If we arrive, like the Cro-Magnons, from North Africa we shall find many traces of their passage and customs at



Cro-Magnon Man

Menton, on the northern shore of the Mediterranean, just where the frontiers of France and Italy meet. Here, in some high red cliffs called the Rochers Rouges, or in *patois* Baoussé Roussé, lie buried many of these magnificent people. There were nine caves in the Rochers Rouges, some of which have been utterly destroyed by blasting operations in the search for building stone for the great hotels and many villas which fringe the bay and form the modern town of Menton. The construction of a railway

along the coast considerably shortened others of the caves, so that nothing very striking remains to be seen by the modern tourist. Thanks to the scientific zeal of the late Prince of Monaco careful excavations were carried out, and the results published, in those caves which had not been previously explored by distinguished scientists.

In the Barma Grande, or Great Cave, a skeleton was found in 1884 by MM. Julien and Bonfils almost 28 feet below the surface. It was that of a man lying on his back facing the sea, and with his head to the north. The floor

Man of the Triple Burial at Barma Grande, Menton

on which he lay was of rock, and two boulders, one on either side, protected his head, and a third his body. On either shoulder was placed a large flint flake like an epaulette; another was on the top of his head. Beside him were some nodules of flint and some teeth of the ox, ibex, and red deer.

In 1892 a triple burial was found by M. Verneau in the same cave. Once again it was 28 feet deep, and a trench had been carefully dug and filled with red earth, which was also sprinkled over the bodies. Nearest to the entrance of the cave was a man, 6 feet 4 inches in height, lying on his back, with his head turned to the left looking out to sea. His crown and necklace were formed of threaded fish vertebræ and incised canine teeth of the red deer. Two large perforated cowrie shells lay one below each knee as if to decorate a garter. On his chest was a double olive in ivory, which according to the Abbé Breuil was a fastening

to a cloak, such objects being in use with the Eskimos to-day. A flint knife 9 inches in length, with one end retouched, lay at his left hand.

At his side lay a girl of eighteen, her head propped by the femur of an ox, her arms bent, one hand under her chin ; she also looked out to sea. Like the chief (if such he was) beside her, she had a crown of shells and fish vertebræ and a bone pendant, but no necklace ; a similar ivory double

The Boy and Girl of the Triple Burial

olive lay on her chest, and in her left hand she held a large flint knife.

Touching her lay a boy of fifteen gazing out to sea ; below his head was a flint blade over 6 inches long, worked at one end to form a scraper. His hands too came under his chin. His head was covered with so many fish vertebræ and pierced Nassa shells that they must have formed a cap, and several pierced teeth lay on his forehead. He wore a three-strand necklace, two rows of fish vertebræ (which make quite pretty beads) and one of shells, the different rows held in position by canine teeth of the red deer pierced at three levels and incised. An ivory double olive lay near his hand, but may have slipped off his chest. Both boy and girl were 5 feet 4 inches in height. All three were of Cro-Magnon race, and dolichocephalic, or long-headed.

Near them were bones of red deer and *Bos primigenius*, the primitive wild cattle. The boy and girl lie now in a glass casket where they were found, but the man with them has been placed in the little museum built by the late Sir Thomas Hanbury at the gate of the Barma Grande.

Cave of the Barma Grande, Menton

Two years later yet another burial was found in this cave, 21 feet farther in than the triple one, and more than 5 feet nearer the surface. It was that of a six-foot man lying on his side, his legs crossed and his hand propping his chin. He looked northward, and lay along, not across, the cave. There was no red earth, but there were three large stones, one on the legs, one on the thighs, and a third on

the chest and head, this one supported by blocks on either side like a miniature dolmen, and showing the first step toward the great stone monuments to the dead of later ages. Like the others, this man wore a crown and necklace of shells and teeth, but instead of weapons a large gypsum crystal lay near his left hand.

At the same level, and rather more than 2 feet from the man with the gypsum crystal, was found an incomplete skeleton which had been partially cremated. The body must have been bound in a crouching position, as the heels touched the base of the spine. The hearth on which the corpse lay was 2 feet deep in ashes, and the same shell ornaments lay near. The skeleton was of Cro-Magnon race.

The custom of burying in red earth, or peroxide of iron, is a widespread one, for red has been considered a sacred or royal colour by all sun-worshippers, since that is the colour of the sun when nearest the earth. In the graveyards of Fiji to-day red-leaved and red-flowering trees are cultivated, for everything associated with the dead must be of this colour, and it is said that the bones of certain chiefs in New Zealand were painted red. On Rotumah Island the corpse was smeared with red paint before burial in a stone vault, and on another of the Pacific islands red turmeric was used. Possibly the red colour represents blood, the symbol of life, and was to give life to the dead in his new existence.

The crouching position is curious, but in Polynesia, Siam, old Japan, and India crouching was the proper position in the presence of the gods, a custom which may have had a very ancient origin.

To return to the Rochers Rouges, in 1872 Dr Rivière, digging in the Grotte du Cavillon, came on the skeleton of a Cro-Magnon man 6 feet 1 inch in height. Besides more than two hundred pierced shells which formed his crown there were twenty-two canine teeth of the red deer hung as pendants from it, and near his left knee was a garter of forty-one pierced shells. At the back of his neck were two big flint knives, and a dagger made of the radius bone of a deer lay on his forehead. With head slightly raised and

left hand under his cheek, he lay looking into the cave. All his body was covered with powdered hæmatite (peroxide of iron), and a little trench cut in the ground near his mouth was filled with the same substance.

Two years later, in 1874, Dr Rivière excavated the Grotte des Enfants, which takes its name from two children, aged four and six years, whose remains he found lying side by side on a hearth in the cave. They were about 9 feet from the surface, and lay facing the west. A solitary flint lay between them; they had no ornaments and no red earth, but each had a kilt made of thousands of perforated Nassa shells.

In 1901 the Chanoine de Villeneuve, searching in the same cave, found 3 feet nearer the surface than the children the skeleton of a woman lying on her back. The body seemed to have been disturbed, then reburied and protected by big stone blocks; traces of hyenas in the cave may point to the disturbers. Her body was covered with an immense number of small Trochus shells forming a quilt. Being unpierced, these shells must have been placed by hand on the corpse at the time of burial. Two pierced shells, some flint flakes, and bones of different animals, including the jaw-bone of a wild boar, lay on her. The woman was of considerable age, and short; under her head was a pebble painted red. Two jaw-bones of very young children were found nearer the surface.

It is interesting to note that in historic times the boar was sacrificed by most of the sun-worshippers to the sun-god, being considered the great emblem of fertility. The sun needed sacrifices of fertile creatures to make the earth fertile. In the New Hebrides skulls of these animals were sometimes buried with important men.

At 23 feet from the surface M. de Villeneuve came on the burial of a man of 6 feet 3 inches. His head, which was turned to the left, lay on a flat stone reddened with ochre to form a halo. His crown and breastplate were of pierced shells, and from the crown hung pendants of red deer teeth. A rock placed to protect the head had fallen and crushed the skull; five stones were set upright to protect the body.

A deer-horn implement and some rough stone tools were his equipment, and in the soil near were the bones of cave-lion, bear, and hyena.

Such are the Cro-Magnons buried in the Rochers Rouges ; most of the skeletons have been carried away to museums. It is a strange company, and the varied equipment of the different individuals for the Long Journey shows a great deal of loving solicitude on the part of the living. We wonder if the boy and girl of the triple burial were killed to keep the tall chief beside them company, and if, as they all stare out to sea, they are gazing at the land from which they came ; whether the woman under the shells was being provided with a covering or a good supply of food since they had not been pierced for threading, and what she was to do with the red pebble under her head. We wonder why one man set such store by a gypsum crystal, and another had a stone halo, and a third that trench cut near his mouth to be filled with hæmatite ; whether the babies all wore shell kilts, and if people usually slept with a knife at the back of the neck or on the forehead.

Not only the Cro-Magnons are buried in these caves of Menton. There was some time before another race in this part of Europe, a negroid people called the Grimaldi race, from the little village of Grimaldi, on the Italian frontier, which is perched above the caves. This race seems never to have spread much in Europe ; they were no doubt always few in numbers, and a great contrast in physique to their magnificent neighbours. The layer in the Grotte des Enfants which contained two skeletons of this race was 2 feet lower than any Cro-Magnon burial there. This means that the Grimaldi folk were settled there before the taller race arrived.

A youth and a woman are buried together ; the woman's height is 5 feet 2 inches, and the youth is an inch shorter. Like anthropoid apes, they had long forearms and curved thigh-bones, the upper jaw projected with big teeth, and they had little chin. The teeth resemble those of primitive Australians and Tasmanians. Traces of this Grimaldi type are found in the skeletons of succeeding ages in France,

Switzerland, and North Italy, the peculiarities of the jaw and teeth being specially remarkable. The face and nose were alike broad, though the head was long. Grimaldi people were by no means pure negro, but are an evolution representing the medium between the black and white races. In many respects this is the strangest of burials. The boy, who was between fifteen and seventeen years old, lay on his right side, his shins so doubled back under his thighs that the heels almost touched the pelvis, his right arm passed beneath the woman's body. The old woman, who was buried later with him, had her knees as high as her shoulders, her feet touching her pelvis, her hands on a level with her chin. She was placed face downward on the youth, and they must both have been bandaged to keep their extraordinary position. Between their heads lay two pebbles of serpentine, and a third lay against the woman's palate. The youth's body showed traces of red ochre; a shallow trench had been dug to receive the body, and under the three stones protecting his head the space was filled with peroxide of iron. The boy wore a crown of four rows of pierced shells, and the woman had two bracelets of them. Two flint blades lay between their skulls, one on the boy's right arm, two more and a scraper near. These two who lay bound together for so many centuries now lie in the Monaco Museum, released from their strange union.

A Magdalenian burial at Chancelade, in Dordogne, shows the same cramped position, the individual being only 4 feet 7 inches in height and resembling in certain respects the Eskimo type.

At Cro-Magnon, a little hamlet on the Vézère adjoining Les Eyzies, a rock-shelter with five skeletons was found when some workmen were making a road. Here lay an old man, a woman whose forehead still bore the mark of a heavy blow, and some fragments of a child's skeleton and those of two young men. It is from this burial, which hints at some wild tragedy, that the human type of this age takes its name. The men were slightly shorter than the magnificent men of the caves of the Rochers Rouges, but of the same type; the climatic conditions of the Mediterranean coast may have

been more favourable to development in physique than those of the inland districts. Sir Arthur Keith says that the Cro-Magnon race was one of the finest the world has ever known.

That yet another type of human lived in Europe at this time is suggested by the skeleton of a man found in 1909 in the rock-shelter of Combe Capelle, near Montferrand, Périgord. It was quite undisturbed, lying with a number of flint tools of Early Aurignacian workmanship, wearing a necklace of pierced shells. Water saturated with lime had dripped through and entirely preserved the skeleton. The man was but 5 feet 3 inches in height ; the skull was long and narrow, and a well-developed chin completed a small lower jaw. M. Boule described this as a primitive variation of the Cro-Magnon race, and Giuffrida Ruggieri as Ethiopian.

The first discovery of a member of the Cro-Magnon race was made in 1823, when Dr Buckland found a skeleton buried in the cave of Paviland, on the peninsula of Gower, Wales. The body had been covered with red ochre, and lay in the cave looking out to sea. It was for long called the Red Lady of Paviland, and was removed to the museum at Oxford. The remains are now found to be those of a man. Tools of Aurignacian type lay beside him, also a mammoth skull.

Returning to Předmost, that camp of mammoth-hunters mentioned in the previous chapter as being in a pass between the plains of Moravia and Silesia, we find what is apparently a family tomb containing the remains of twenty persons, eight children and twelve adults. The grave was oval, 13 feet long by $7\frac{1}{2}$ wide, and was fenced on one side by the shoulder-blades, on the other by the lower jaws, of mammoths ; the whole was covered by a good layer of stones for protection. Most of the people were buried crouching, but the remains had been pushed and crowded together. The skull of an Arctic fox lay in the centre of the grave. One child wore an elaborate necklace. These people were large-headed and big-brained. They were fond of decorating themselves ; their necklaces were of carved ivory beads,

shells, and the pierced teeth of bears, lions, foxes, and hyenas. Two teeth of a young wolf had been grafted together at the root so as to form a crescent-shaped ornament. These men may, like the Papuans of to-day, have worn double teeth stuck through their noses. They tattooed themselves, white, yellow, and red earth for this purpose being found, and also an ivory mortar, made of a hollowed tusk, holding peroxide of iron. A store of mammoth tusks was found in the tomb. Some of the ends of tusks were used as spear-points, decorated with conventional designs; and both tusks and ribs are often covered with engravings of what look like ears of corn. A large, two-pronged ivory fork was found, which the Abbé Breuil thinks was used to prepare the gut of animals so that it could be used for strings; also big mammoth ribs made into spades for shovelling snow or sand. Ivory spoons, forks, and polishers were found, with daggers made of the leg-bones of lions or cave-bears, such daggers being probably thought to convey some of the strength of these animals to the user. A decorated ivory pendant incised with a design of circles was picked up, and a fragment of mammoth shoulder-blade on which painting in ochre had been attempted, the design being conventional. A very conventionalized representation of a female figure was engraved on a mammoth tusk, and there are quaint human statuettes in mammoth bone, the metacarpus of the animal lending itself without much alteration to the production of mushroom-headed, crouching figurines.

These people of Předmost must have been dressed in skins; all the tools for scraping and preparing these have been found, together with bone piercers. As well as these objects in bone and ivory an enormous number of flint tools was found. These consisted of scrapers, awls, points, borers, gravers, and some clumsy laurel-leaves, already mentioned in the previous chapter. Dr Absolon said there were not less than forty thousand flint tools!

A great many people must have lived at Předmost for a very long period of time, and they must have been well supplied with all they needed. Besides the store of mammoths' tusks, thirteen in number, put aside for future use,

there was a heap of wolves' skulls broken open to extract the brain.

Sir Arthur Keith declared after a study of the skulls found in the tomb that these people were true Europeans, and that since eight hundred generations would carry any one of us back into Aurignacian times it is probable that the blood of these people flows still in some individuals of Northern and Western Europe. A study of the brain-capacity of a woman's skull from Předmost showed that it was more than 200 c.c. larger than the average brain-capacity of a modern Englishwoman. The brain-capacity of a male skull was found to be 100 c.c. above that of the average Englishman. Sir Arthur Keith noted that the greatest peculiarity in the Předmost type was the forward projection of the face ; the nose, front part of the jaws, and chin were half an inch more in advance of the ear-passages than is usual with modern Englishmen. This is balanced by a noticeable projection of the forehead.

The settlement of Předmost is no new discovery ; in fact, it is the earliest discovery of its kind. As long ago as 1571 it was mentioned by Blahoslav, though only spoken of as containing the remains of giants. Nor is Předmost the only interesting place in this region of what is now Czecho-Slovakia. There was a burial discovered in the loess at Brno (Brünn), where among a collection of bones was a fairly complete male skeleton. Near the skull lay a necklace of six hundred pierced shells, a mammoth shoulder-blade, the skull and ribs of a *Rhinoceros tichorinus*, two big mammoth tusks, and some teeth of cattle and horses. Surely a mighty hunter lay here ! The bones, the earth, and the surrounding objects were all coloured with red ochre. A collection of disks of varying size of chalk, bone, ivory, and stone lay near the man, and a remarkable human statuette in mammoth ivory which was unfortunately broken at the moment of extraction. It is the biggest ivory Palæolithic statuette known, being nearly 10 inches long. The head has been broken off the body, and it never had legs ; only the left arm was carved, and that has been broken, but exists ; the head shows little detail, but there is a twist of hair across the

low forehead and very large eye-sockets. The Abbé Breuil thinks it may have been the double of the dead man. The actual skull resembles the ones at Předmost, except that the chin is longer and more projecting; they all represent the same Central European Cro-Magnon Aurignacian race. Just as Europeans to-day differ very greatly in type in the different parts of the Continent, so did members of the Cro-Magnon race of ancient times differ, because interbred with other races, which, when we realize it, explains the likeness to the Eskimo in the Chancelade skull, to the Ethiopian in that of Combe Capelle, and the variations between the magnificent men of Menton and those of Cro-Magnon itself.

In the cave of Kostelik, or Pekarna, two most original knives, made of the jaw-bones of horses and engraved conventionally, were discovered. These knives are unfortunately broken.

A good many statuettes of Aurignacian age carved out of ivory, horn, or soft stone have been found, such as the Venus of Willendorf, cut out of oolithic limestone and originally painted red. Willendorf is on the left bank of the Danube, 20 kilometres above Krems. The Venus is rather over 4 inches in height; her face is not detailed, but much care has been expended on rendering her hair, which is done by six or seven rows of scallops, giving the effect of hair growing in tufts like that of modern Bushmen. The arms are disproportionately small, and the lower part of the legs broken off.

From Brassempouy, in the Landes, France, comes a woman's head, covered by a sort of check hood, carved in mammoth ivory. The mouth is not shown, and only the head exists. In 1922 M. and Mme Saint-Perier found a fine mammoth ivory female statuette at Lespugne (Haute-Garonne). Once again the features are not given, and the feet are hardly indicated. The arms are thin and fragile, the neck elegant, but other parts of the body are very much exaggerated. Several more mutilated statuettes were found at Brassempouy; one known as the Venus Innominata is a real work of art. A much rougher figure in deer-horn

from Pont-à-Lesse (Belgium) recalls in some respects those mentioned at Předmost, made from the mammoth's metacarpus.

VENUS OF WILLENDORF, AUSTRIA

A steatite Venus, 18½ inches long, came from the Grotte du Prince at Menton. In this instance neither the features nor the hair were shown, an ovoid representing the head. Five more of these female statuettes were found in a small

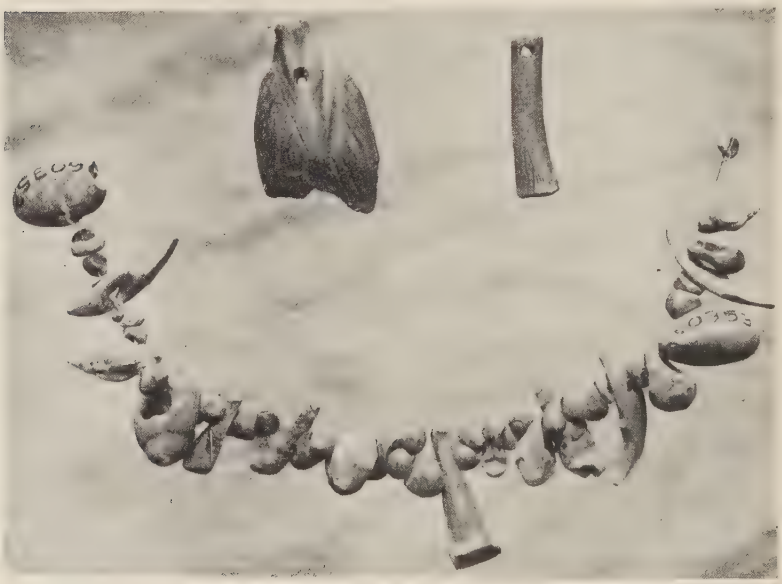
recess above this cave at Menton. Four of them were of crystalline talc and one of bone. There was some uncertainty about their exact age, as M. Julien, their discoverer, said nothing about his find for twelve years, but burials of Aurignacian age, with the typical tool, a split-bone point, were in the cave, and the objects found were

Statuettes from Menton, France

probably all made by the same people. Others were found in the Aurignacian levels of Barma Grande.

As well as these statuettes, fine bas-reliefs of Aurignacian age are known. They were discovered by Dr Lalanne at Laussel, in Dordogne. One is of a woman holding in her hand a bison horn; she is fat, and has some of the characteristics of the Bushmen. Her face was either never represented or has been destroyed, but the outline of the head is well shown; there are some traces of red as if at one time this bas-relief had been painted. A second one of a woman even fatter than the first was found near by. No doubt the fatness of the women was considered a beauty,

and reflected credit on the hunting prowess of the men who fed them. A third bas-relief was of a man, of elegant figure, wearing a belt. The head, legs, and arms had been broken, but from what remains it seems likely that he was drawing a bow, or throwing a spear. A fourth bas-relief was sold to Germany by one of the workmen, bribed by a professor who came to join the French excavators.



Necklace of Teeth and Shells from Sergeac

The Aurignacians were fine painters as well as sculptors. One of the earliest forms of wall-decoration man invented was that in which men put their own hands on the rock-face and painted round them. Primitive people to-day still do this, often filling their mouths with colouring matter and squirting it round the fingers, thus simplifying extremely an artist's outfit. In a rock-shelter at Sergeac and in the cave of Font-de-Gaume, in Dordogne, in the cave of Gargas, in the Pyrenees, and in that of Castillo, in Spain, as well as in various other places, such paintings of hands are seen in both red and black. In some instances one or more finger-

joints are missing, and the custom of cutting off finger-joints as a sign of grief, initiation, or to propitiate the gods still exists among modern primitive peoples.

As painting began with colouring round hands, drawing and engraving seem to have started in the making of wavy lines with a finger in wet clay ; this is now called " macaroni." From this it was not a great step to drawing animals in outline, usually in silhouette, with only two of the four legs, and sometimes omitting details of ears, and expending not much care on the eye. Often when the animal is in profile the horns are put on full face, perspective presenting an added difficulty. But the artists advanced quickly, and the engraving of bisons and other animals became very fine, as in those at La Grèze, Pair-non-Pair (Gironde), and Gargas (Haute-Garonne). What is thought to be the oldest engraving known is one of a *Rhinoceros tichorinus*, part of a mammoth, and another indistinct animal on a small piece of schist, found in the Grotte du Trilobite (Yonne) and interpreted first by the Abbé Breuil. There is an engraving of a fish in a rock-shelter in the Gorge d'Enfer, near Les Eyzies, perhaps commemorating the pride of some Aurignacian fisherman in a record catch.

Some of the finest paintings of these times are in the cave of Font-de-Gaume (Dordogne). The cave-entrance is high up on the hillside, and the cave, being under the care of the French Government, is lit by electricity ; a guide and key are to be found at a cottage on the roadside before taking the hill-track. The narrow passage at the entrance leads into a hall 40 metres long and between 5 and 6 metres in height. Here is one of the most celebrated pictures—two reindeer, one licking the other's head. These animals are both painted and engraved. There are also paintings and engravings of mammoths, bisons, horses, antelopes, and more reindeer. The painting varies from a thick line rather clumsily outlining the creature to flat washes in shaded red and black, which are very effective. Sometimes red signs are painted on the animals' flanks, perhaps representing wounds. A red ochre painting of a double-horned woolly rhinoceros high up in a cleft above one's head, in a recess

so narrow that it is impossible for more than one person at a time to enter it, is said to be Late Aurignacian in date. The Font-de-Gaume paintings have been described in the Magdalenian chapter, but the Aurignacian artists, as well as their artistic successors, worked here and at La Mouthe. The caves of the Trois Frères and Gargas have many Aurignacian engravings.

Many of the animal silhouettes in the cave of Castillo, near Puente Viesgo (Spain), belong to the Aurignacian era. Half a mile farther on than Castillo is the entrance to the difficult cave of Pasiega. Here a limestone implement, roughly made, was found by the first explorers, Dr Obermaier and M. Wernert, thrown down on a sort of natural altar, a block of stalagmite. Facing it was a kind of throne, this being partly of natural formation, partly due to human workmanship. A finely engraved bison to the left of the throne, and examples of all the different styles of painting, chiefly in red, including human hands and feet, are mostly the work of Aurignacians. Not far away, at Hornos de la Peña, the walls show much of the finest work of Aurignacian engravers.

As for tools, the split-bone point, known sometimes as the *pointe d'Aurignac*, was a great advance from the utilized bones of an earlier day. Polishers, arrow-straighteners, awls, and the very rare eyed needles were made of bone. The engravers invented a series of tools for their art which show a great dexterity in flint-chipping. There were also scrapers of all kinds for the treatment of skins, various types of knife-blades, one called the " La Gravette point " having a side swelling, which finally developed into the double-shouldered point of Font Robert, and an early variety of laurel-leaf. What is called a " beaked graver " is a characteristic Aurignacian implement in France; but when these people lived in North Africa their tools varied, beaked gravers did not exist, and the collection of tools is known as the Capsian industry, Capsian being a corruption of the name of the province of Gafsa, one of the chief districts for these North African settlements.

The Aurignacian people of Cro-Magnon race spread from

North Africa to Britain, from Spain to Russia, hunted the mammoth in Moravia, the wild horse at Solutré, the reindeer on the Riviera. They were of fine physique, especially when a moderate climate favoured development ; they were splendid artists and hunters, had an admiration for fat women, and buried their dead with great ceremony, generally in red earth. The first human type resembling modern man, they struggled with the vagaries of a late-glacial climate, and brought to a Europe of fewer seas and greater landmasses than the Europe of to-day a technical skill in flint-working which added to the comfort of life, art which enriched it, and a creed which, including belief in a future existence, gave vision, and invested the dead with dignity.

CHAPTER XIV

THE MIDDLE PALÆOLITHIC AGE—MOUSTERIAN ERA

25,000–50,000 B.C.

> All that tread
> The globe are but a handful to the tribes
> That slumber in its bosom.
>
> W. BRYANT

WE step backward into a strange world, a Europe peopled by a type of human called the Neanderthal man, from a skull of this race found in the Neander valley, near Düsseldorf, Germany—a race which, as far as we know, has no living descendants. It seems to have been a human experiment which failed.

This was the period of the fourth glaciation, when more snow fell than rain, and when large tracts of Northern Europe, including a great part of Britain and all Scandinavia and Finland, were covered with ice. The Baltic Sea was a great glacier reaching as far as Denmark, Schleswig-Holstein, and the North of Germany, leaving but 350 miles free between it and the drift of the Alpine glaciers. In Scotland the glacier stretched from the mountains to the sea, and the coast subsided 130 feet. From the Lowlands of Scotland to the South of England there were to be seen but few trees ; the Thames valley and Suffolk had an Arctic flora.

The mammoth, woolly rhinoceros, and reindeer roamed the Thames valley, travelling over to France by land, their bones being found in the gravels of the Somme as in those of the Thames and in the Dogger Bank of the North Sea. The advancing icefields of the North drove the reindeer south, and it occupied the districts which before were the home of the bison and wild horse. The horse grew scarcer as the reindeer increased. Arctic cold swept for the first time all over Western Europe, and at its oncoming the

forests vanished, willow, spruce, and fir taking the place of more luxuriant trees.

The musk-ox, Arctic fox, and lemming arrived; and when animals such as these, of the tundra type, appear it indicates the coldest period of a glaciation. The cave-lion and cave-hyena, animals which prefer a temperate climate, made an effort to adjust themselves to the oncoming cold, and survived for a time to remind men that the bitter climate had not always existed.

Great rainstorms in summer rivalled great snowstorms in winter. There are signs in the latest Chalky Boulder Clay that the ice reached the outskirts of London.

The Mousterian people must for a time have lived alongside the Aurignacians, who, being of so vastly superior a type, finally crushed them out. At the rock-shelter of Audi, in the valley of the Vézère, a good many flint tools of Mousterian manufacture were found which had copied the new Aurignacian manner of flaking, forming almost a transition between the tools of the two ages. Since the two types of humans seem to have had no connexion with each other, it may be that a few early arrivals of Aurignacian race left a few of their tools among the mass of Mousterian implements. The Mousterians were not particular about the kind of stone of which they made their tools, and were apt to use whatever was local. It may be that the inclement climate made travelling for barter a difficult proposition, and so they made shift with what was handy. Even at the coldest period the South of France was favoured in climate, and the people who lived in the Rochers Rouges at Menton must have had an easier time than their brothers farther north. The very hard conditions stunted and weakened the Neanderthal race, making them unfit in every way to compete with their very superior Cro-Magnon successors. But by the time they disappeared, either slain in battle or submerged, they had peopled Europe for thousands and thousands of years.

The Mousterian era was in time a far longer period than the four periods of the Upper Palæolithic Age put together. It was in this age that men were first driven to seek the

shelter of the foot of cliffs or mouths of caves, though in summer they had open camps, and maybe this first necessity to crowd together instead of living the wild, free life of hunters affected their physique. The extreme damp must have been very trying, and some of the bones found show that both animals and men suffered from rheumatism. There are places where with animals denoting a warm climate tools of the Mousterian culture are found, such as Montières, near Amiens (France), Krapina (Croatia), Taubach and Ehringsdorf, near Weimar (Germany), and Menton, on the Franco-Italian Riviera.

Now for the first time men buried their dead, laying them on the floor of their caves or rock-shelters. No doubt when they shifted a camp perpetually, in the times when the climate favoured a roving life, a death would at once cause the abandonment of the camp as a place of ill-luck, and the dead would be devoured by wild animals. The majority of skeletons must have crumbled in the course of centuries ; only those exceptionally protected would survive.

As early as 1848 a skull was extracted from Forbes Quarry, Gibraltar, which was later classified as of Neanderthal type. It was in 1856 that some workmen, clearing out a small limestone grotto in the valley of Neanderthal, not far from Düsseldorf, came on a skeleton, which they partially destroyed. The skull-cap, part of the legs and arms, a collar-bone, and fragments of the rest were rescued and placed in the museum at Bonn. Much discussion raged over this find. Schaaffhausen, Busk, Huxley, Virchow, Lyell, King, and Schwalbe all discussed its age, and it was nearly forty years before its universal recognition as a definite type of human, known as the Neanderthal man, or to the French as Mousterian man.

The most complete skeleton of Mousterian age was that found in a small grotto at La Chapelle-aux-Saints, in Corrèze, France. In 1908 two French Abbés of the name of Bouyssonie and the Abbé Bardon found this burial in a ditch cut in the clayey soil of the grotto. The good state of preservation of this man's skeleton was partly due to there being no great weight of deposits overlying it, only a thick-

ness of between 30 and 40 centimetres. Beside the remains were tools of Mousterian type, and the bones of animals include those of the hyena, horse, woolly rhinoceros, reindeer, bison, and wolf. From the cast taken of the skull

NEANDERTHAL SKULL FROM LA CHAPELLE-AUX-SAINTS, CORRÈZE, FRANCE

In the British Museum (Natural History)

a rather low type of brain is suggested, and the man's height was not more than 5 feet 4 inches; he had slightly curved thigh-bones. The jaw was heavy, and he had a rudimentary chin.

Two Belgian investigators, de Puydt and Lohest, had found in 1886 at Spy, in the province of Namur, Belgium,

nearly complete skeletons of two individuals with flint tools and remains of animals typical of Mousterian times. Various other remains have been found in different parts of the world, and from a study of the whole collection a very definite picture can be formed of this type of human, who is now extinct. These people were short, with heavy, overhanging eyebrow-ridges and receding foreheads, hardly any chin, and a narrow, long skull. It seems probable that the big toe was more or less prehensile, and from the curve of the leg- and thigh-bones that the normal attitude was not quite erect. They walked on the outer side of the foot, which had little arch, and they had two peculiarities in common with anthropoid apes—the forearm was very short in comparison with the upper arm and the shin in comparison with the thigh. The very receding, almost nonexistent chin is one of the most characteristic traits in the face of Mousterian man. The chin is considered essentially a human characteristic, and one of the chief differences between early man and the ape. The chin is here, but very slightly developed. Teeth do not alter as much as skulls, and Mousterian man had quite modern teeth, though on account of the food he ate they were soon worn down. Though worn, they were not decayed. The muscles of the jaw show that the teeth were more used to crush than cut, which argues a vegetarian more than a meat diet. The root of the nose was depressed, and the nose itself rather flat and wide, but this organ differs more from the noses of apes than do those of modern men. There was plenty of room in the skull for a brain, but the convolutions of the brain-matter were far simpler than are found in any human race now. From the small development of the frontal lobes, the seat of intellectual power, it seems likely that Mousterian man was not worried by deep thinking, and in this matter was less advanced than the most primitive of existing peoples. He had probably no greatly developed power of speech. Neanderthal man had a wider face than modern man, and a thicker and broader neck. All his bones were thicker.

Sir Arthur Keith thinks that the peculiarities of the

Neanderthal type may have been due to the particular activity of the small pituitary gland at the base of the brain. Men of this race varied slightly in type in different countries, as Europeans do to-day.

In 1908 a ceremonial burial was found in the rock-shelter of Le Moustier, in the Vézère valley. A youth about sixteen lay with his head on a stone pillow, his right forearm propping it. The split and burnt bones of wild cattle and a stone axe (*coup de poing*) were buried with him. This skeleton was sold for a very large sum to Germany by Otto Hauser, the man mentioned before as having a lease of some of the most interesting prehistoric sites in France. There were two rock-shelters one above the other at Le Moustier, showing that it was inhabited all through the age, and by the Aurignacians in later days. The first remains of what is known as Neanderthal man were found in 1848 at Forbes Quarry, Gibraltar; and in 1864, at the meeting of the British Association, this Gibraltar skull was compared with that found at Neanderthal, but the subject at that time did not create much interest. The skull is now known to have been associated with Mousterian tools, and modern research revealed its real importance.

At Gibraltar in June 1926 Dr Dorothy A. E. Garrod, excavating a rock-shelter originally discovered by the Abbé Henri Breuil in 1917, came on a skull embedded in the matrix. This skull is of Mousterian date, and is considered by Sir Arthur Keith to be that of a boy of ten years of age. Mousterian tools and animal remains were also found. Dr Garrod still continues her investigations.

At Krapina, in Croatia, there were remains of ten or twelve broken skulls and many other bones in a cave which had originally been hollowed out by the river now far below it. Some of the bones had been burnt, a fact which suggested that these people were cannibals. But, as the Abbé Breuil pointed out, the bones, though broken, were not split lengthwise in the manner followed when marrow, one of the great delicacies of cannibal feasts, is to be extracted. The bones were broken and dispersed through the layer. It may have been the remains of a cannibalistic

funeral feast. These people were of Neanderthal type, with slight variations due no doubt to local peculiarities. Before it was excavated this cave was entirely blocked by

NEANDERTHAL SKULL FROM FORBES QUARRY, GIBRALTAR
In the British Museum (Natural History)

rocks fallen from the roof and sand and stones washed in in times of flood.

Yet another Neanderthal man was found in 1909 at La Ferrassie, in Dordogne, in a rock-shelter which MM. Capitan and Peyrony had been studying for ten years. This man did not seem to have been buried; perhaps he just lay down to die in his own shelter, and the dust of ages covered

him. A year later a second skeleton, which may be that of a woman, was found not far from the first, and since then fragments of three children who had been buried. A sixth burial, of a child, revealed some interesting peculiarities. As in the case of four of the other skeletons at La Ferrassie, there was an overlying slab of stone to protect the body, a triangular grave had been dug, and the corpse was beheaded. This strange custom crops up at intervals and in all parts of the world. The legs were bent back. On the underside of the stone slab were cup-marks cut in the stone. Rocks on which these are cut occur all over the world, Europe, Asia, Africa, and America all possessing specimens. Except that they must have had to do with some of the oldest existing cults of the dead we cannot tell their meaning, but though this has been forgotten the reverence in which they were held still exists, and they are to be met with on lonely moors, in forests, on the walls of churches, or in museums, their age-long mystery enwrapping and guarding them.

A place where there were many remains of this age is La Quina (Charente), where Dr Henri Martin in the course of years of careful research found a skeleton of a Mousterian woman resembling the Neanderthal type, the skull of a child of eight, and fragments of about eighteen other individuals.

At St Brelade's Bay, in Jersey, human teeth of this age were found similar to those of the burial at Krapina.

There are various other human remains of uncertain date, for since one culture glided into the other imperceptibly they cannot be exactly placed. Two teeth were found in a deposit at Taubach, near Weimar; the great length of the molar and the ridging of the enamel have made some people think it is a chimpanzee's tooth. Near were the traces of hearths and bones of *Elephas antiquus*. At Ehringsdorf, near Weimar, a jaw was found in 1914, and two years later part of a child's skeleton, including its jaw and some teeth. Both jaws show an absence of chin, and resemble the Neanderthal type. They are thought to belong to the Old Mousterian times.

A skull found at Talgai, Queensland, Australia, and shown

to the members of the British Association at their meeting in Sydney in 1914, was described by Dr Stewart Smith as that of a boy of fifteen. Near it were found the bones of extinct animals. Sir Arthur Keith said that no fossil type known had teeth and palate so nearly resembling those of an anthropoid ape as this Talgai skull, yet in actual date it may be not far removed from the Neanderthal man of Europe.

In 1925, during the digging of the foundations of Lloyd's new building in Leadenhall Street, London, part of a skull was unearthed. It was described by Professor Elliot Smith as that of a left-handed woman of forty-five. The skull was found in undisturbed gravel 42 feet below the surface, at the same level as remains of the woolly rhinoceros, and has been compared to both the Piltdown and Neanderthal types. This so-called " Lady of Lloyd's " is the second most ancient skull found in Britain.

In November 1925 a skull was found near Cohuna, Victoria, Australia, which Professor Mackenzie claimed as " the most archaic skull known to science." The diameter of the canine teeth exceeded that of those of the Piltdown skull.

Another interesting part of a skull of Mousterian age was found by Mr Turville-Petre in 1925 while excavating on behalf of the British School of Archæology in Jerusalem. The skull was found in the Robber's Cave near the Lake of Galilee, and is therefore known as the Galilee skull. It is of the Neanderthal type, with immensely thick eyebrow-ridges. The parts found included the forehead, right cheek-bone, and part of the floor of the skull. The dissolved lime salts in the cave had contributed to the preservation of the remains. The man seems to have been of the same type, and the tools found near of the same technique, as those of the Mousterian epoch in Europe.

When making tools Mousterian man preferred to strike off a flake and fashion it rather than chip a heavy nodule into shape. This is a great advance, not in skill, but in saving of time and material, from the method used by earlier races. He also used bones as anvils, though he did not make fine bone tools, but sawed and banged and scratched with

bones, using them as pushers and stilettos. It may be, of course, that there were more bone tools than we think, for bone is so perishable compared with flint that only a small proportion would survive, and it is likely that where there was a scarcity of flint man would use bone.

Some of the flint cores or disks found are called " tortoise-

THE GALILEE SKULL, SHOWING THE BROW-RIDGES

cores " from their shape. From these Mousterian man had struck off blades of a certain shape known as " Levallois flakes." Another tool was what the French call the *coup de poing* (literally " blow of a fist "), known in English (not so expressively) as " hand-axe." Of these there were varied shapes. A flat, oval type is called by the French *limande* (" dab-fish," which fish it resembles in shape). A more usual kind is pear-shaped, thick in the middle, and with bevelled sides, ending in a point or a chisel edge. Little heart-shaped ones are flaked all round.

Men used hard river pebbles as hammers. The Mousterians depended much on " points " ; these tools were made of a

The Robber's Cave, in which was found the Galilee Skull

flake with one flat surface, trimmed at the edge, pointed at the end, and leaf-shaped or triangular. Some almond-shaped, bi-faced tools are relics of older times. In the Sahara deposits double-shouldered points have been found.

Men in this age had scrapers for cleaning skins, the edge slightly serrated ; a few of these scrapers were made at the edge of a blade —two tools in one. They had also knives for cutting and a few awls.

These tools of the Old Mousterian industry can also be called of Levallois type, from Levallois-Peret, near Paris, where there were found first certain oval flakes having a bulb of percussion on one side only, and faceted on the other ; these flakes and blades of the same type were chipped from cores carefully prepared (very often tortoise-cores), and have on the striking plane a little facet made by numerous little blows. Almost all Mousterian tools show this technique.

This race of heavily made men, the most recent representatives of a very old human race, had a wide distribution. They roamed the banks of the Thames, the Somme, and the Marne, the Meuse, the Rhine, and the Danube. Their habitations are found in the caves of Kent's Hole, in Devonshire, and Paviland, in Wales, in the rock-shelters and caves of France, in Belgium, on the Italian Riviera at Grimaldi and the Grotte delle Fate, in Spain, Germany, Switzerland, in Austria, Poland, and Russia, Asia Minor, Egypt, and a great part of Africa. One of the greatest racial changes we know of swept these people away. They knew no art, yet they invented variety and handiness in tools and housing as a protection from a rigorous climate. They changed their diet to suit their altered conditions, and lived in some parts of the world with other races, such as the negroids of Grimaldi. During the latest inter-glacial epoch they knew rather better conditions, and had probably invaded Europe during the time of the penultimate glaciation, driven by that bitter cold from more northern and eastern lands. They became extinct at least twenty thousand years ago, after they had fought a long fight against bitter cold, and when the temperature rose and life became rather easier they were swept from the scene by men more highly endowed, who had not their difficulties to contend with.

CHAPTER XV

THE LOWER PALÆOLITHIC AGE—ACHEULEAN, CHELLEAN, AND PRE-CHELLEAN ERAS

> And inch by inch the coral islands grew,
> Like daisy garlands, in the ocean blue,
> And inch by inch the glaciers ground away
> The granite boulders into boulder-clay.
>
> R. C. Macfie

WHEN we come to consider the pioneers of prehistory we find that Great Britain leads the way. As long ago as 1690 Mr Conyers found a pear-shaped hand-axe (*coup de poing*) with an elephant's tooth in Gray's Inn Lane, on what had once been the Thames river-bank. It was near some elephant-bones, and Mr Conyers had the acuteness to see that these bones were different from those of the modern elephant. He put them down to some elephant used by the Romans, and recognized that the Thames region must have been very different in the time of the tool. The implement, which was of Upper Chellean workmanship (a phase to be described later in this chapter), is now in the British Museum, described as "a large black flint shaped into the figure of a spear's point," this description showing that long before prehistory was even dreamt of as a subject a British observer had recognized human handiwork in the chipped stone.

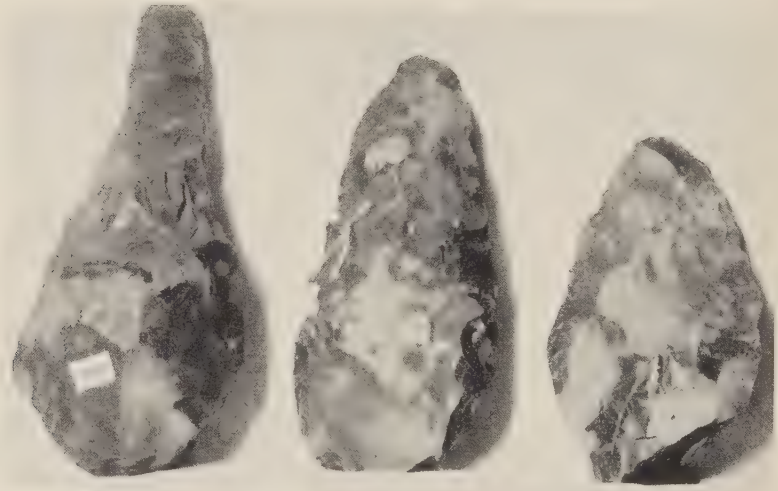
A century later, in 1797, Mr John Frere, F.R.S., wrote an account of the chipped flint implements he had discovered at Hoxne, in Suffolk. Judging from the position in which they were found he ascribed them to "a very remote period indeed, and to a people who had not the use of metals." His account was published by J. Evans and Prestwich after the discoveries of M. Boucher de Perthes.

The next important papers on chipped flints were published by M. Boucher de Perthes, of Abbeville, France, who

FLINT IMPLEMENT FOUND IN GRAY'S INN LANE IN 1690

made a study of those he had found in the Somme valley gravels. He claimed that they were of Deluge age, and his claim was laughed at. Dr Rigollot, of Amiens, who had

at first been of those who disbelieved the claim of M. Boucher de Perthes, later, by his discovery in 1854 of similar implements 10 feet below the surface at Saint-Acheul, near Amiens, was converted to the beliefs of M. Boucher de Perthes. The latter reasoned that since the fluviatile gravels in which he was searching were, he believed, of Deluge age, therefore remains of man should be found in them. He



Implements from Saint-Acheul, collected by M. Boucher de Perthes

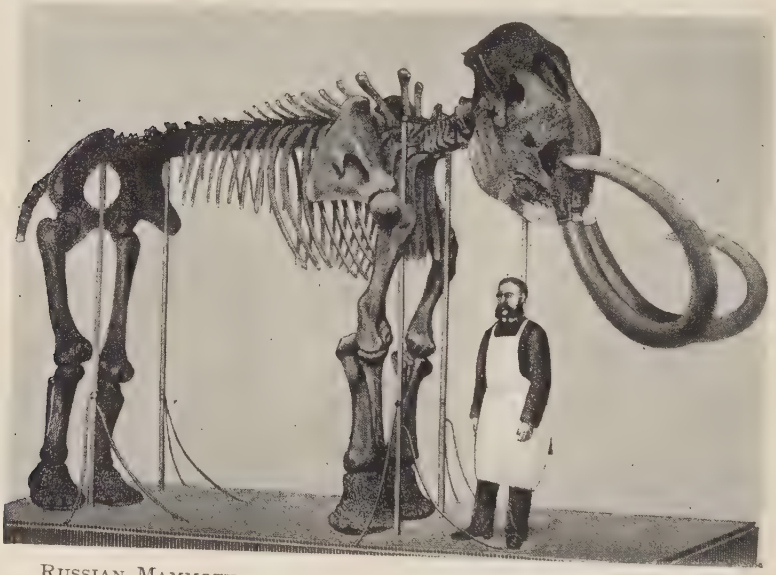
found shaped flints with bones of the elephant and rhinoceros. Both of these discoverers were scoffed at and disbelieved, so new is the oldest of all subjects, and so loth is man to believe in his long ancestry. Like wine, genealogical records must not be kept too long for fear of deterioration.

Other investigators were not slow to come forward, among whom may be mentioned Prestwich and Evans, and Lartet and Gaudry, who recognized in 1863 the truth of the statements of Boucher de Perthes. The Lower Palæolithic industry resembling the types of tools found at Saint-Acheul by Dr Rigollot was at first called Acheulean; later this term was reserved for the development of the tools found at Chelles-sur-Marne, which are known as Chellean when the

fauna of *Elephas antiquus* is abundant. This modification was not at all happy, because the Chelles site contains only rolled primitive implements, and is later in formation than the old gravels of Saint-Acheul. All tools of earlier date and rougher technique are simply classed as Pre-Chellean. Traces of this Acheulean civilization are to be found over the whole of Africa, in Asia Minor and West Asia as far as India, and in the south and west of Europe (England, France, Spain, and Italy), but none in other parts of the world, though such a development has often been suggested wrongly. India was already the boundary and end of the European world, and from Chellean times onward forms part of it. We are apt not to realize how much India has shared in the vicissitudes and advances of Western Europe, so that no storm can occur in the progress of one without the waves dashing over the other.

The industries of the Lower Palæolithic civilization, though divided into different stages, have so many similarities that they can be described as a whole. They consist of a collection of tools, the most elaborate types of which are bi-faced, more or less almond-shaped, with a cutting edge, the centre thick, the point sometimes rounded, sometimes rectangular, or pointed like a pick or like an axe. Some tools are very long, others oval, heart-shaped, triangular, and occasionally circular. Some of these tools were used by hand, as round the base a large surface of the original skin of the flint nodule or pebble can be seen, proving that it was not hafted. The three different styles of technique, Acheulean, Chellean, and Pre-Chellean, can be traced in the varieties of form and workmanship in the hand-axes. The tools were sometimes made of nodules or pebbles cut into shape with a hammer-stone. This makes a thick tool, chiefly to be found among the early types. In some later times the tools were made on large flakes, cut from the flint cores and thinned with trimming and retouch. This secondary work, which was very fine in Acheulean and Late Chellean times, was rather coarse and rough in Early Chellean and Pre-Chellean days. When the base of these two-faced tools is cutting and thin, the tool was probably inserted at

right angles in a handle so as to make the head of a club, a kind of battleaxe, a very useful weapon in fighting wild beasts. There were numbers of other tools with slight modifications, struck off flints of all sizes. The flakes, contrary to those of Mousterian times, show that the nucleus from which they were taken had no special preparation. They were simply struck off, and show a single striking



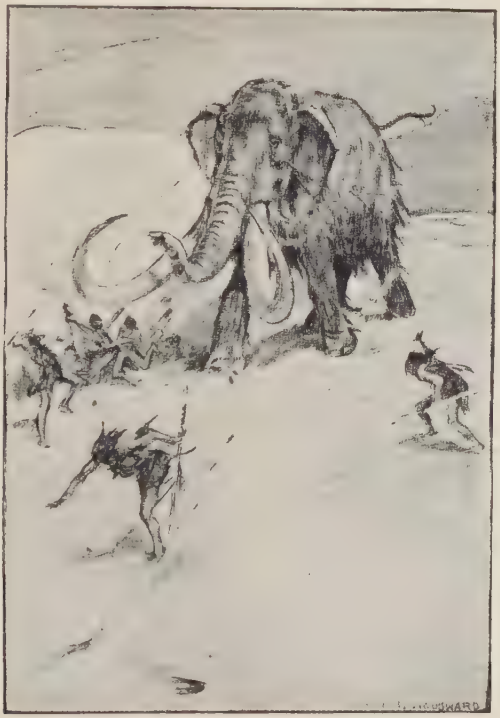
Russian Mammoth, frozen on the Banks of the River Lena, Siberia

platform. Their great size leads one to think that they may not have been struck off by hand, but with some type of mallet.

With these principal tools there were many of secondary importance, particularly of Early Chellean and Pre-Chellean date—tools for cutting, piercing, scratching, and scraping. In Acheulean days there were very varied forms of side-scrapers, points, and knives. All these were used in a hundred ways for hunting, killing, or for making wooden tools, very few of which have been preserved.

One of the few wooden articles which have survived is the

point of a spear, found by Mr Hazzledine Warren in the peat at Clacton-on-Sea, near some remains of *Elephas antiquus*. Although the Clacton-on-Sea site is of Old Palæolithic age, the industry there shows no double-faced tools, only flakes, though not Mousterian ones, but probably contemporaneous



RESTORATION OF ELEPHAS PRIMIGENIUS (MAMMOTH)
Height at shoulder, 9–10 feet.
In the British Museum (Natural History)

with the Upper Chellean levels. Where a stray wooden implement has been preserved by a lucky chance, thousands must have perished.

Recent Acheulean industries are mixed with the oldest Mousterian ones, and show the two-faced, pointed type of tool of a small size found at La Micoque, in Dordogne, a tool like a stone lance-point. In the Early Acheulean times these lance-points were much heavier, and were often found with

very carefully made 'dab-fish' tools (*limandes*). These 'dab-fish' tools were smaller, thinner, and more skilfully made as the age advanced. The Acheulean workman often gave his *coup de poing* a curious twist, and by his method of chipping made a smaller, lighter, and more elegant tool than his predecessors.

As flint found on the surface of the soil is fissured by the atmosphere and unsuitable for tool-making, man soon started mining for this material. At first it was not systematic mining as in Neolithic days, but small pits were dug in the seams of chalk in which the flint nodules were embedded. A good example of such mining was recently discovered by Mr W. H. Cook and Mr J. R. Killick at Rochester, in the Medway valley.

Chellean and Acheulean man lived in out-of-door camps, and must have done a great deal of travelling. He was a fine hunter. He worked all through the oncoming of an Ice Age, having started in semi-tropical conditions, and adapted himself far better than the animal world to changing temperature. At the end of the Acheulean period rock-shelters such as the one at La Micoque, near Les Eyzies, in Dordogne, were popular as places of residence affording more protection against cold.

Some flakes and hand-axes of Chellean type were found at Creswell Crags, in Derbyshire, associated with remains of cave-bear, cave-lion, and hyena, sabre-toothed tiger, and hippopotamus (those of the last two much water-worn). This site is important as being the most northerly point in Britain at which the habitation of Early Palæolithic man has been proved. There is no proof that man lived in the actual cave here, for the finds are water-worn, having fallen down chimneys or fissures in the surface soil and having been washed into the position in which they are found. Creswell, though never submerged, seems to have been surrounded by the ice sheet in later times, so that the next tools found belong to the Upper Aurignacian culture.

It is not certain that Acheulean man has left a single bone of himself to guide us in the study of his type. The only human remains found are attributed to the Old Chellean

FLINT IMPLEMENTS FROM OLDBURY CAMP, KENT

Showing the transition from the Mousterian to the Acheulean types. The six flints at the top of the plate are flaked on both sides, the four lower on one side only.

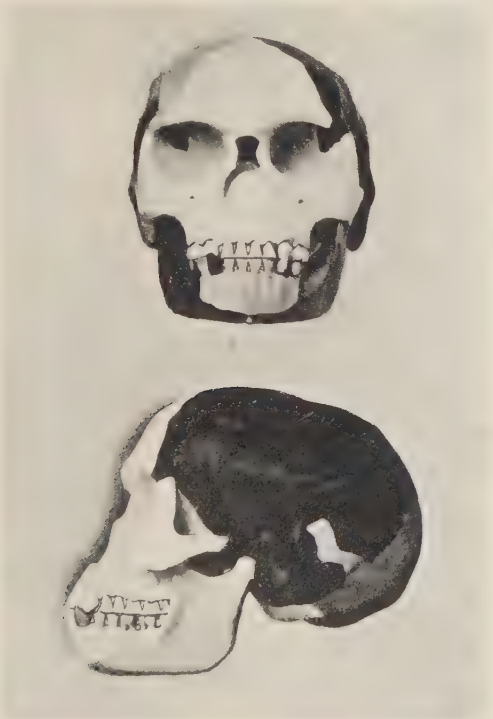
period, but these are not dated by any very definite tools. All that we can say is that they are of very great age, for the bones of very ancient animals are found in the same strata. What is known as the Galley Hill skull was found at Galley Hill, in the chalk of the Thames valley. It was claimed at first as being of Acheulean age, but this is not generally accepted.

The very old sand-beds of Mauer, near Heidelberg, which contain the warm Pre-Chellean fauna of *Elephas antiquus*, *Rhinoceros etruscus*, and three types of horse, etc., yielded a human lower jaw. The discovery was made in 1907. The jaw is almost complete, very massive, and there is no chin. The teeth are human, although very big, the canines being no longer than the other teeth, showing that man did not use his teeth for defence ; the jaw is otherwise extraordinarily brutal in appearance. In some respects this Heidelberg jaw is nearer to that of the great apes than to that of man ; and the jaw of Neanderthal man is exactly half-way between that of Heidelberg and the modern jaw, showing the way evolution came. There was little room for the tongue to move in the mouth of Heidelberg man ; he cannot have used speech as we do, though his range of sound would be more varied than in an animal.

The next great discovery was made in England in 1912 by Mr C. Dawson, a geologist. Labourers in search of road-metal, while digging at Piltdown, near Lewes, in Sussex, came on a bit of skull, which they brought to Mr Dawson. Some years later at the same place he found a bigger piece, part of the frontal of the same skull, broken at the time of the deposition of the bed of sands and gravels in which it lay. A careful search was made, which disclosed part of the right side of a jaw, a canine, and some fossilized bones of hippopotamus, a primitive type of elephant known as stegodon, deer, beaver, etc. There were also a few very primitive tools. The discoverer claimed that Piltdown man was of Pre-Chellean type. The tools were no guide to the age, being only rough flakes without type. An elephant's bone, apparently worked at one end, found near the skull was first hailed as an implement, but the Abbé Breuil stated that the

working had been done by the teeth of a giant beaver (trogontherium), which had gnawed it. The remains of beavers were indeed found near.

Piltdown is on the banks of the Ouse, and some of the oldest animal bones on the site had been much rolled and



Restored Model of the Piltdown Skull
In the British Museum (Natural History)

water-worn, washed in evidently from some older layer. The human bones are not rolled, and so are more likely of the age of the gravels on which they lay. These gravels are older than those of the existing streams of the country.

The discovery of fragments of a second skull and a tooth similar to one of the first jaw permitted of a better reconstruction, but as neither was more than fragmentary there is some latitude for varieties of interpretation. All the

same, it is certain that this being was not at all of Neanderthal type, but had a skull much more nearly resembling that of modern man, but with a jaw like a chimpanzee, including a prominent canine.

Dr Smith Woodward coined a name for this man of Piltdown—*Eoanthropus dawsonii*, the "dawn man." This name is objected to by M. Marcellin Boule on the ground that though the Piltdown man is ancient he was already far on the path of evolution. Even though we have as yet no accurate knowledge, we know that the history of man's evolution must stretch backward for countless centuries. Man is the result of no sudden changes, and is no 'sport.' Through the thick mists of an antiquity till lately undreamed of the sound of his plodding footsteps comes as he toils upward, urged on by some invisible force to an unknown goal.

It is difficult to see the exact chronological connexion between two such different human types as those of Piltdown and Mauer. The Mauer man seems to have been the primitive Neanderthal type. Both belong certainly to an extremely ancient epoch of the Quaternary Age, and may be of either Chellean or Pre-Chellean date. It is not impossible that they were contemporaries, and they bear undoubted witness to the original complexity of the human species and the diversity of its types even at such a very early stage of development.

The Old Palæolithic industries are, as has been said, to be found generally on the actual sites of the open-air camps in which the men of that age lived. These camps were covered in later days by other deposits or by fluviatile sands or gravels or glacier boulder clays. The industries consist of flints with acute angles and flints the angles of which are battered or water-worn. The valley of the Somme is the classic region for these industries, the principal stations being Saint-Acheul, Montières, and Abbeville.

The Somme valley is cut out of the chalk platform of Picardy. The river left at varying levels a series of gravel beds and sands, witnesses of the successive epochs of its excavating work. There are four terraces, at 60, 40, 30,

TABLES TO SHOW THE POSITIONS AND SLOPES OF TERRACES IN THE SOMME AND THAMES VALLEYS

Details of the Somme are taken from various papers by Professor Commont, of Amiens; the sunk channel is cut in the chalk below the present bed.

Terraces of the River Somme [1]

(Average heights above the lowest channel and above the sea (Ordnance datum), with distances of the sites from the sea.)

—	Above Lowest Channel	Amiens		Abbeville (15 *miles from the sea*)
		Saint-Acheul (29 *miles from the sea*)	Montières (25 *miles from the sea*)	
Sunk channel	—	43 feet (O.D.)	33 feet (O.D.)	50 feet (O.D.)
First terrace	33 feet	76 feet (O.D.)	66 feet (O.D.)	17 feet (O.D.)
Second terrace	100 feet	143 feet (O.D.)	133 feet (O.D.)	50 feet (O.D.)
Third terrace	133 feet	176 feet (O.D.)	166 feet (O.D.)	83 feet (O.D.)
Fourth terrace	183 feet	226 feet (O.D.)	216 feet (O.D.)	133 feet (O.D.)

The terraces of the Thames are nearly level as far up as Staines, but there begin to rise with the river and are not so well defined.

Terraces of the River Thames [1]

(Average heights of solid shelf above the sea (Ordnance datum) and depth of lowest channel.)

—	Staines	Richmond	Wanstead	Hornchurch and Swanscombe
Sunk channel or Thames gorge .	—	24 ft. (O.D.)	60 ft. (O.D.)	65 ft. (O.D.)
Lowest terrace or flood-plain . .	42 ft. (O.D.)	17 ft. (O.D.)	10 ft. (O.D.)	10 ft. (O.D.)
Middle or 50-foot terrace . . .	57 ft. (O.D.)	55 ft. (O.D.)	45 ft. (O.D.)	45 ft. (O.D.)
High or 100-foot terrace . . .	108 ft. (O.D.)	100 ft. (O.D.)	90 ft. (O.D.)	90 ft. (O.D.)

Distance from Staines to Richmond, 17 miles; from Richmond to Wanstead, 13 miles; from Wanstead to Hornchurch, 8 miles; from Wanstead to Swanscombe, 12 miles.

[1] Tables from *Archæologia*, lxiv.

and 15 metres respectively, not counting that of the level to-day. This modern level hides the lower bed, which near Amiens is 15 metres below the river-level, and as much as 30 metres at the river's mouth.

Each of these terraces is complex, for the cutting down was not continuous—the activity of the river went in cycles. First it cut, then it filled up its bed, so that the deposited material sometimes covers the bed of an earlier age. In this way, while Chellean industries are found in the upper sands of the second terrace and in the bottom gravels of the later terrace, Pre-Chellean tools are found only in the gravels of the same terrace, and recent Chellean or Old Mousterian implements only in gravels and sands of the two lowest levels. While the sand and gravels of these lower levels were being laid down the wind and rain formed on the higher terraces certain deposits called 'loess,' not due to river activity. The oldest loess is rarely found preserved lower than the second terrace, being often washed out by later river erosion. The young loess is laid down uniformly on all terraces, even on the most recent, where it is found under the peat and marshy ground of the most modern bed.

It was the study of these successive beds, as much due to fluviatile as to atmospheric action, which first allowed M. Commont definitely to establish the subdivisions of the Old Palæolithic Age in Northern France.

The Pre-Chellean industries in the 40-metre gravels are associated with the remains of very old warm fauna, such as *Elephas antiquus* of an old type, *Elephas meridionalis*, *Rhinoceros etruscus*, and *Rhinoceros merckii*, great hippopotamus, sabre-toothed tiger, giant beaver, etc.

Upper Chellean remains are found in sands superposed on these gravels and at the base of all recent terraces. While Old Chellean tools are found in the sands of terraces 3 and 2, sands which overlie the gravels, the older Acheulean is at the base of the old loess, and the middle or later in its upper levels. The fauna no longer shows *Elephas meridionalis*, nor *Rhinoceros etruscus*, nor the sabre-toothed tiger, but lion and a younger and further evolved fauna.

There are certain signs at the end of Upper Chellean

times in the second terrace that there was a cold epoch, for the chalk-beds have been subjected to hard frost, and crumbled in thaw by the river's edge. Mammoth remains confirm this testimony of a cold climate.

Upper Acheulean tools are found only on the surface of the old loess beneath the younger loess. Various Mousterian stages are represented at the base and in various levels of the younger loess, and in the sands and gravels of the lowest terrace.

Loess was formed in the arid periods of climate under steppe conditions, being wind-blown sand or finely pounded rock crushed by glaciers and spread over the flat ground in times of flood. Loess is composed of fine quartz sand and carbonate of chalk. The chalk dissolved by rainwater is deposited in curious concretions known as "dolls" of loess. In certain districts the glacier water was thick with this sand and chalk and spread out when far enough from its source, leaving flat stretches of mud. A wind always blew from the glaciers owing to the cooling of air above them, and this wind, drying the mud-flats, finally blew the mud (become sand) before it, depositing it where it now lies. As this could take place only when the glaciers were large enough to create these wide mud-flats the loess can have been deposited only during the glacial periods, which accounts for the separated layers and for their position outside the area of the icefields. There are only three layers of loess known, though there are thought to have been four glaciations. On the top of a loess layer is a layer of loam, due to a warmer period succeeding a glacial one, during which much rain fell, and, sinking into the loess, dissolved the lime and oxidized the iron in it, the result of this action being the turning of the loess into loam. By the depth of the loam it can be seen whether this more genial period was long or short.

The younger loess, in which Mousterian and Aurignacian tools were found, was the result of the Fourth or last Ice Age. The older loess, in which are Late Acheulean remains, must have been deposited in the third glaciation. According to M. Commont, there are signs of a yet older loess going

back to Upper Chellean times, and which must have been due to the Second Ice Age.

The remains of a cold fauna are found in loess—mammoth, *Rhinoceros tichorinus*, and reindeer, the latter only in the recent layer.

In the latter half of Acheulean times the climate grew steadily worse with the oncoming of the Third Ice Age, great rain and floods preceding the snowstorms of Early Mousterian times. As we go backward our information grows more scanty, and the periods of time immensely longer than those dealt with in more modern eras.

CHAPTER XVI

CLIMATE, GEOLOGICAL CONDITIONS, AND ANIMALS IN THE LOWER PALÆOLITHIC AGE

> Time, haggard and changeful and hoary,
> Is master and God of the land.
>
> A. C. SWINBURNE

IT is extremely important to try to establish the correlation between the terrace, the deposits of the terrace, and the different Ice Ages, and first to know something about these extraordinary phenomena. Much discussion has raged over the number and duration of the Ice Ages. Drs Penck and Obermaier after much study, the one in the Alps and the other in the Pyrenees, declared for four glaciations or Ice Ages, and Dr Penck named them after four little streams which flow down from the Alps, the Würm (the most recent), Riss, Mindel, and Günz. These ice periods are divided one from the other by milder epochs, or inter-glacial stages, in which plants and animals loving a warmer climate returned to the lands from whence they had been driven by Arctic conditions. The different glaciations were not of equal severity, nor the inter-glacial periods of equal warmth and length, and in any case we are confronted by such ages that time begins to have no meaning.

The fourth or Würmian glaciation was less important than the third or Rissian one, when the snow-line descended a thousand metres lower than in the later period. The level of the snow-line seems much the same in the periods of Riss and Mindel, and the First or Günz Ice Age directly concerned only Scandinavia in Western Europe.

At the moment of the greatest distribution of the ice in Europe the Alpine glaciers reached Lyon, and the valleys of the Vosges and Pyrenees were ice-filled. An immense sheet of ice covered all Scandinavia, the North Sea,

Scotland, North England, nearly all Wales, and reached far beyond the present western coast-line of Ireland. Holland, Belgium, the greater part of Germany, and wide tracts of Russia were all overlaid by this huge mass of ice. North America had its ice-sheet, and the Rockies their glaciers like the Alps.

England, France, and Scandinavia suffered many alterations of land-level in Quaternary times. The land at one period extended far out into what is now the Gulf of Gascony, and the Breton coast-line stretched far beyond its present limits. A great river ran from England into France in a wide valley now submerged by the English Channel.

Many theories have been suggested to account for the production of an Ice Age. The changes have been ascribed to the alteration of the earth's orbit round the sun, which varies from a circle to an ellipse. The earth's path being at present almost, though not quite, circular round the sun, and winter in the Northern Hemisphere occurring when the earth is in perihelion, or at the point of the ellipse nearest the sun, the temperature is modified and the earth brought in its coldest period nearest to the source of its energy. The occurrence of Ice Ages has also been ascribed to the precession of the equinoxes, which would introduce a larger eccentricity into the earth's orbit. The weak point of all these theories is that as far as is known the glacial and inter-glacial stages are not alike in the two hemispheres, nor are they strictly periodic, nor do the glacial periods of one hemisphere correspond to the inter-glaciations of the other. It has been suggested that the different geographical conditions, the greater height of mountains and the stretch of glaciers in their vicinity, combined with astronomical reasons, especially variations in the phases of sun activity, would fully account for the cold of an Ice Age. Man is still too much of a newcomer on the earth to explain everything; like a child, he wonders at and cannot explain the surrounding phenomena.

The animals moved about, driven by the variations of climate, so that at one time the Norwegian lemming was as far south as Southern France and the reindeer at Menton

on the Riviera, Santander, and in Catalonia. Traces of the macaque, a kind of ape, have been found as far north as Norfolk, in the Forest Bed deposits there, and in Bavaria. Search in the alluvial soil of the plains and valleys of Europe has revealed the existence in Old Palæolithic times of many mammals now extinct or driven to milder countries.

The classic animals of all the inter-glacial levels were *Elephas antiquus, Rhinoceros merckii, Rhinoceros etruscus,* and *Hippopotamus major. Elephas meridionalis* was scarce in Pre-Chellean times, being a survival from the earlier Tertiary Age ; with this elephant there was the sabre-toothed tiger, soon extinct, the macaque, red deer, roe-deer, giant deer, the giant beaver, various kinds of bear, the horse, wolf, and other animals. Of the three kinds of elephant (*Elephas antiquus, Elephas primigenius,* and *Elephas meridionalis*) the *Elephas antiquus* was straight-tusked, and left in the later cold climate, returning when the warm conditions were renewed. The *Elephas primigenius,* or woolly mammoth, seems to have entered Western Europe with the first glacial times, then retired, to make a reappearance in each glacial period.

The Pre-Chellean and Chellean climate was warm, due to the first inter-glacial period between the Günz and Mindel stages of the first and second glaciations. Acheulean and Chellean times were marked by great shiftings of the surface of England and France and of the seas surrounding Great Britain. The end of the Chellean period was colder, as were some parts of the Acheulean.

No date can be put to the Acheulean and Chellean Ages. Such changes as that from a warm to a cold climate require the passing of countless centuries, before which the short period of historic times is as a bubble on the rolling river of the ages.

The changes of climate and stream levels must have been widespread, for the work of the British School of Archæology in Egypt has proved that the levels and periods of the ancient Nile are almost identical with those of the Somme and Thames valleys. The latest, 10-foot terrace contains Mousterian tools, the 50-foot terrace Acheulean

ones, and the 100-foot terrace Chellean specimens. There were, of course, no glaciations in Egypt, but the glacial periods of Europe were replaced by seasons of flood.

Turning to the observations which have been made of the succession of terraces in the Somme valley, we find that the conclusions apply not only to most of the western valleys of Europe, but as far as the Nile. Among those who have recently studied the Thames valley terraces may be mentioned such well-known men as Messrs Dewey, Reginald Smith, and Sandford. Their investigations show Old Mousterian implements, with at one time a cold, at another time a warm, fauna, on the 50-foot terrace, Acheulean and Upper Chellean on the 100-foot terrace, Chellean and Pre-Chellean in the gravels of 120 feet.

The change to greater warmth indicated in all deposits of Acheulean days is seen by the remains of *Elephas antiquus*, an elephant which lived in a warm climate, eating the branches and leaves of trees. At this stage the woolly elephant and woolly rhinoceros are alike absent; they appeared in France only when the advance of the glaciers drove them south; and in no stage of Acheulean times is the reindeer found in France.

A very good idea of the late inter-glacial flora can be gathered from a study of the tufa beds not far from Paris, at Celle-sous-Moret (Seine-et-Marne), France. This tufa is a hot-springs deposit lying on the middle river gravel terrace, and besides Old Mousterian type implements contains the remains of box, fig-tree, canary laurel, sycamore, Judas-tree, and spindle-tree, all of which require a mild climate. The climate was far colder at the end of Old Palæolithic times than at the beginning, and as we work backward the fauna changes almost imperceptibly, till we find ourselves at last dealing with animals flourishing in a warm climate.

Near Zürich there is a deposit of lignite which is all that remains of forests which in one inter-glacial epoch covered that part of the country.

Toward the end of Acheulean times, with a cold climate, the mammoth, or woolly elephant, reappeared, at first in

great numbers, with large, curved-back tusks sometimes 23 feet in length. It had a heavy coat, a skin twice as thick as that of the modern elephant, with a layer of fat beneath it, so that it was well equipped for a rigorous climate. Its chief companion was the woolly rhinoceros, of which the Aurignacians painted so good a portrait in the cave of Font-de-Gaume. The woolly rhinoceros carried two horns on his nose, and had a coat of both wool and hair, the horns, placed one behind the other, being such a weight on his nose that the wall dividing the nostrils was of bone instead of gristle.

As well as these two terrifying monsters, there were various types of horse, some now obsolete, lion, red deer, cave-bear, hyena, bison, etc. Remains of these animals, which were more indifferent to changes of temperature, are found in the Somme valley in the Upper Acheulean deposits (the upper layers of the older loess) and in the lower layers of the same loess.

We must now try to see what connexions there are between the human industries and the glaciers round the Pyrenees, the Alps, in Central Europe, and in England. The oldest Palæolithic industry is found in abundance only in the Pyrenees and South-east England, and is scarce in the valleys of the Rhône and the Rhine.

The Abbé Breuil established the fact that in the Pyrenees region, taking as the base the terraces that the geologists have distinguished, there is no human industry in the terrace of 90 metres, but that there are rolled implements in the 60-metre terrace, showing the appearance of man between the time of these two. M. Depéret showed that in the valley of the Garonne and in Ariège the 60-metre terrace joined with the moraine of the glaciers of the Mindel Ice Age. In the valley of the Garonne the 40-metre terrace had been destroyed, but this is not the case in the valleys of its tributaries; consequently in Ariège this 40-metre terrace is connected with the Rissian moraine, and in all valleys the 35-metre lower terraces, containing rolled Chellean tools, and retaining non-rolled Mousterian implements, are in relation with the maximum Würmian moraine.

But the Pyrenean glaciers were small, and in this country human industry was in quartzite, which makes it more difficult to classify the implements in the subdivisions of the Old Palæolithic Age.

In South-eastern England, on the contrary, on the edge of the immense glaciers which covered most of the British Isles, meeting the Scandinavian glaciers, it is possible to make a precise study of human workmanship in the different stages of Old Palæolithic times. The Scandinavian glaciers, reaching East Anglia, brought boulders from Scandinavia to a region where the Old Palæolithic people worked excellent flint. It is not always easy in a region where successive great glaciers have been to determine which glaciation has to do with which sheet of erratic material brought over by ice movement.

One most interesting point to study is the Cromer coast. Here a cliff rising sometimes to the height of more than 120 feet belongs to different periods of Old and Middle Quaternary times. It has been carefully studied by English geologists, such as Clement Reid, and prehistorians such as Mr Reid Moir and the Abbé Breuil. The latter in their study of the East Anglian deposits have come to the following conclusions.

After the cold marine deposit of the Weybourn Crag (a deposit probably corresponding to the Scandinavian period of the Günz glaciation) the country rose from the sea, and, part of the marine bed being eroded, a layer of the stone bed was exposed, consisting of boulders of flint sometimes embedded in chalk, which forms the sub-soil. The situation was as it is to-day on the sea-coast, and at low tide the rich flint beds were uncovered and Pre-Chellean man came and struck off very large flint flakes, finding it a favourable spot. Only splinters and remains of split-off flakes were generally found, flakes which for some reason had been rejected, for when the tide came in man carried away the best flakes to finish his tools elsewhere. Very few finished implements were found ; one of them was of a good bi-faced type.

The rising of the Rhine valley and of the whole of the

floor of the North Sea affected the coast and region round Cromer, transforming the land into a great marsh, the deposits of which now constitute what is known as the Cromer Forest Bed. This bed is divided into three layers : (1) Fresh water, (2) Estuary level, (3) Fresh water. Man naturally did not live in this marsh, so one very rarely finds there struck-off flint flakes showing his existence. The corpses of drowned animals are, however, fairly numerous, and indicate the same warm period as was mentioned as being present in the high Somme valley levels of 40 metres. Here are *Elephas meridionalis, Elephas antiquus, Rhinoceros merckii, Rhinoceros etruscus, Hippopotamus,* the macaque monkey, the trogontherium, or giant beaver, the sabre-toothed tiger—in fact, all the fauna of the first inter-glacial period.

At the end of the warm period, when the climate changed, there is a thin deposit left by a cold sea, distinguished by the *Leda myalis,* a shell, to be followed immediately by a fresh-water level with Arctic vegetation. This is the start of the second glacial period, proved by the deposition by the Scandinavian glaciers of a great mass of blue clay called ' till.' Toward the base of this blue clay Mr Reid Moir noticed a beautiful Chellean tool that the glacier had brought from some other place, and which therefore is certainly older than the till. The decay by exposure to the air of the surface of the till denotes that the glacier retreated, an idea which is confirmed by a deposit of river gravels, sometimes of great depth, and crowned by carbonic matter, once vegetation. It is possible that these beds mark the second inter-glacial phase, but information of the contents is up till the present insufficient.

Then a glacier, probably a different one, in the time of the third or Rissian glaciation (though this has been disputed) took possession of the country, and deposited the enormous mass of the Contorted Drift. These peculiar twisted beds of East Anglia are due to the huge pressure of the Scandinavian glacier, the weight of which must have been enormous, and which, meeting the glacier which covered Britain, pushed the strata into contortions and folds in its

forward march. The pressure came from the north-east, and the drift contains boulders of Northern origin brought by the ice, and is itself a mixture of sand, loam, clay, and gravel.

At this time the glacier churned up a mass of chalk, sometimes taller than the height of several houses, and these deposits often resemble what is known in South-east Anglia as Chalky Boulder Clay. This Boulder Clay is the lowest moraine of the great ice-sheet.

The frontal moraine of this glacier is still visible in the interior of the country forming an enormous bow, and sometimes consists of masses of pebbles coming from the shore and pushed inland by the glacier.

After the retreat of the great Scandinavian glacier man, at the time of the last inter-glaciation, took possession of the country, making bi-faced tools of a highly evolved type at the beginning of the Mousterian or in Late Acheulean times. Several have been found, particularly at East Runton, at the base of gravel beds which, though much more recent in formation, have deeply ravined all the older deposits. This is a very angular type of gravel, not river-carried, but due to local ice action during the last glaciation ; it was split by the cold into small fragments and is not rolled. '

This succession established by the study of the Cromer layers is confirmed by other local observations where tools are more numerous, as, for instance, at Warren Hill, not far from Cambridge. The Abbé Breuil and Mr Reid Moir found beneath the recent Chalky Boulder Clay of Würmian date, in a brown fluviatile deposit of the last inter-glacial epoch, almond-shaped tools of the late type of Old Mousterian or the last Acheulean epoch. These fluviatile deposits ravine other glacial deposits consisting of gravels, sands, and clays false-bedded (pseudo-stratified). These gravels were formed by the action of the glacier before last having mixed and remade gravels of older beds than its own. These gravels contain great quantities of tools which have been much knocked about, tools made by man in Old Acheulean, Chellean, and Pre-Chellean times, showing that

these periods were partly long before the Rissian glaciation. Similar observations, showing the same chronological succession, have been made by Professor Marr, of Cambridge, near Warren Hill, at High Lodge, and at the Traveller's Rest pit, Cambridge.

Hoxne, in Suffolk, which was examined in 1707 by John Frere, belongs to the extreme end of Acheulean times, and shows a temperate period between the last two Ice Ages.

We can realize what an enormous period of time the Chellean stage occupies in the Old Palæolithic Age when compared to the Mousterian epoch, and how much longer the Mousterian times were than the Upper Palæolithic incident ; and then there is all the time before man made an appearance on the globe to consider. It seems as if the industrial progress of humanity first followed a leisured rhythm, which became faster and faster as the superior races succeeded the prototypes or primitive humans, of which only a few remains and a certain number of the latest skeletons have been found.

This concludes the formidable length of Quaternary times, during which man lived through three glacial periods and three returns of warm climate and fauna. It is extremely difficult to appreciate the enormous length of the period. Sir Arthur Keith estimated that the Pleistocene Age, otherwise the first stage of the Quaternary Age, occupied 400,000 years. Dr Obermaier estimated the duration at at least 700,000 years.

In the latter half of the Pleistocene era the volcanoes of the central *massif* of France were active, pouring out rivers of lava. In Auvergne on a stretch of 80 kilometres a hundred volcanoes belched forth rivers of fire.

It seems almost as if Nature, confronted for the first time with a creature who was determined to dominate her, tried by a series of overwhelming *tours de force* to daunt man. And he watched through countless centuries the fight between the sun and ice, the agony of rocks first thrown up in molten streams of fire, and then ground to dust by glaciers, and blown before bitter winds or rolled in floods over the earth's surface. The peat mosses were formed at the end

of the Pleistocene era, vegetation growing in the gullies worn by glaciers or rivers and decaying, leaving the vegetable deposit known as peat, or lignite. Oceans changed their beds, glaciers melted or advanced, countries which had been one were divided by rolling seas. One of the least powerful of the roamers in the forest was stirred by a vision of a world of which he would be the ruler, and seizing a rough stone in his hand he put comfort behind him, and started out on the road which was to place humanity as the crown of creation.

CHAPTER XVII

MAN AND HIS RELATIVES IN THE TERTIARY AGE

Of this fair volume which we World do name.
W. DRUMMOND

MANY and fierce discussions have raged as to whether man existed on the globe in Tertiary times, and modern discoveries tend to show that he probably did. We shall study in the following chapter the two great divisions of Tertiary times, but it is only in the later one that we can hope to find some indications of man or a manlike being. It is beyond question that traces of man are to be found all through Quaternary times, since the very dawn of that era. We are therefore prompted to ask if older geological strata can show proofs of his existence. Man travelled in all countries which he could reach without crossing the sea, and is to be found in the constant company of a certain group of animals, such as the elephant, rhinoceros, hippopotamus, horse, ox, deer, pig, goat, ape, wolf and dog, bear, hyena, and various types of felines. So that if the differences and developments in human type were regulated by the same laws as guided the developments and differences of these companions, traces of the human or protohuman type should be met with in the Tertiary deposits. This is more or less philosophic scientific reasoning which requires further search to be confirmed, but is very probable.

Traces of man may be furnished by the discovery of the remains of human bones or of tools. Bones of the size of a human being or a big ape are rarely preserved, and are far scarcer than those of some of the bigger animals. Men, like the big apes, have fairly long lives, and far fewer descendants than the browsing and hunting animals. So in a given length of time there are far fewer human than animal remains to be preserved. On the other hand, the mental

faculties of apes, and still more those of man, defend them from destruction, and from the attacks of wild beasts, more than the lesser faculties of the other creatures.

These reasons explain why we find so few human and simian remains in the Quaternary levels, above all in the older earths, and why we find still fewer in the Tertiary strata before the nearly universal distribution of mankind in Quaternary times.

When we search for a hint of the type of human who made the first tools and knew the use of fire, some forerunner of man as we know him, we have only one indication of the possible way this creature came. The " missing link " has become a popular phrase, but by this time we have seen that modern humanity did not come to its infinite possibilities as a man may inherit gold, by some sudden piece of luck, that the upward struggle has been hard and long, and that when the greatest difficulties lay in the path the greatest advances were made.

In 1891 Dr Eugène Dubois, having made up his mind that the " missing link " would be found in Java, left Holland and went to search there, and came on an upper molar tooth in September of that year on the shore of the river Bengawan, near the village of Trinil. The river flows at the base of a not quite extinct volcano, and has cut its way through deposits of volcanically projected tufa and clay, one of which at a depth of 350 metres is rich in bones of animals near the base. The volcanic beds rest on a bed of coral limestone of Tertiary age, which in turn is on a bed of clay containing sea-shells with their valves closed, which suggests that they were killed suddenly, perhaps by an eruption. The molar tooth was found in the same layer as the animal bones, many of animals, such as the stegodon, a primitive kind of elephant, and the pangolin, now extinct, the rest being those of creatures no longer living in Java and resembling those of animals of Late Pliocene age found in the Siwalik Hills of India. A month after the discovery of the tooth the top of a skull-cap was found quite near, at the same level, and in the following year the thigh-bone of the left leg and another tooth. These remains were

brought to Europe, and the Dutch Government began excavations, but only one more tooth was found. The thigh-bone and the skull-cap were found 50 feet apart, but as both simian and human remains are very rare, and no others were found, it is probable, or at least possible, that they belonged to the same being. The thigh-bone showed that the creature walked upright ; the teeth were remarkably big ; the brain-capacity of the skull lay between that of the higher apes and man, recalling the Neanderthal type, but also resembling that of a very large gibbon ; and judging from the area of the first temporal lobe of the brain, if we accept Dr Dubois' conclusion, this being had a primitive form of speech.

This creature was named by Dubois *Pithecanthropus erectus*, or " ape-man," and though the layer in which the remains were found is thought to belong to Early Pleistocene times there is some doubt whether it should not be dated Late Pliocene. It is difficult to know whether we have here an ape or man ; in any case, it is the highest known man-like and the only walking ape, or the lowest ape-like man known– possibly an experiment in the direction of man which failed. We must wait till fresh discoveries give us some clue.

These are the only remains analogous to man found at the frontier of Quaternary and Tertiary times. They are too young to belong to man's ancestor, and may be only one of the many experiments which probably surrounded the type or types which succeeded. One theory is that man, or rather the proto-human type, appeared in Oligocene times in Egypt in as modest a way as marked the first appearance of apes (*Propliopithecus*).

Apes already showed a great variety in their development. Mr Pilgrim, who discovered and described the ape known as *Sivapithecus*, pointed out that the back molars were more human than those of any other known ape. The Siwalik Hills in India are celebrated for the richness of animal remains in their Middle Miocene and Upper Pliocene beds, and it is from these that most of the remains of fossil apes have been drawn. Three types of *Dryopithecus*, an ape

known in Western Europe, and so named because it lived in oaks, were found in these hills, one of the three being a giant type. Certain of these apes were not far removed from the modern types of gorillas and chimpanzees, while

ORANG-UTAN (SIMIA SATYRUS)
Over-all length, 5 feet 6 inches.
In the British Museum (Natural History)

others, as far as their teeth go, are not very different from primitive humans. The type known as *Palæopithecus* was studied by Lydekker and said to resemble in some points the chimpanzee, in others the gorilla, and had some connexion with *Dryopithecus*.

Fragments of big apes have been found in other parts of the world, confirming the belief that in Tertiary times there were many varieties of these creatures, such as the *Plio-*

pithecus, of the gibbon family, and the *Propliopithecus*, remains of which have been found in Egypt.

Up till now North America has not given any remains of apes in the Late Tertiary beds, except the very doubtful

CHIMPANZEE (ANTHROPOPITHECUS TROGLODYTES)
Height of specimen as mounted, 2 feet 6 inches.
In the British Museum (Natural History)

tooth of *Hyperopithecus* in Nebraska. But in Quaternary times, when the continent had, like Western Europe, its great glaciers, with frontal moraines reaching and covering the plains, the mammoth existed over all the land ; so it is possible, though not proved, that man could reach it also as this elephant did at some earlier moment. South America, where the aboriginal fauna is always very peculiar,

is the home of monkeys of a special group, with prehensile tail and thirty-eight teeth, and never harboured bigger apes, so it is useless to look there for any possible ancestor or relative of man.

GORILLA (ANTHROPOPITHECUS GORILLA)
Height, 5 feet 6 inches.
In the British Museum (Natural History)

Returning to Europe to look for traces of man's handicraft in Tertiary times, we must recall the discussion which was opened as long ago as 1867 by the Abbé Bourgeois, who had collected a series of broken stones at Thenay, near Orléans, crackled as if they had been in contact with fire. At that time the existence of man was considered to be limited to a few thousand years, and the Abbé's theories were scouted,

though M. de Mortillet suggested that perhaps a precursor of man had made these so-called tools. The strata in which these stones were found at Thenay was of Upper Oligocene date, and so belonged to the end of the first Tertiary time, when all the mammalian species were as distinct as they are to-day. No one now believes in the human workmanship of these flints, but it was very courageous of the Abbé to suggest such a problem for discussion in his day.

In 1871 M. Carlos Ribiero found flints, which were also broken, in the valley of the Tagus at Otta, in a bed of Upper Miocene age. These were believed to be man-made at the time of discovery, a belief which is rejected to-day.

Another discovery of flaked flints was made at Puy Courny, in Cantal, France, in 1877, by Rames. They were associated in a gravel bed with animals of Upper Miocene age, such as the dinotherium, which was an elephant-like creature more than 6 feet taller than any elephant to-day, with short tusks in the lower jaw, the hipparion, a primitive three-toed horse, and the mastodon. The gravels of Puy Courny and Puy Bondieu which contain the flints in question are not on the original site where they were laid down, but have been pushed into their present position by the action of a great landslide, the soil having been much displaced, contorted, and kneaded by the action of the great volcano of Cantal, as M. Boule has demonstrated ; they have also been pierced through and buried under streams of basalt. The very strong mechanical actions which accompanied these phenomena were probably of a nature to produce the effect attributed by many authors to human agency. It is the opinion of the Abbé Breuil that the working was natural.

Professor Marcellin Boule, of Paris, made a careful study of eoliths (the name for flints which seem to be shaped like rough tools) yielded as a by-product at some cement works at Guerville, near Mantes. The cement was made by mixing chalk and clay, and as the chalk contained flint nodules some of these passed through the mixing-mill, where the two ingredients were mixed in water revolving with great velocity for twenty-

six hours. At the end of this time a great many of the flint nodules are identical in shape and chipping with some of the eoliths found in strata of Tertiary and Quaternary age and claimed as man-made. If a deposit of flint nodules is firmly embedded in clay, and then the impact of waves or a land movement of overhead gravels exerts pressure or delivers blows on the nodules, similar chipped flints are produced. The chipped surfaces of those worked on by the sea display a differing patina, since the sea has been working away through the centuries unceasingly. The pressure of ice on flints firmly embedded will be found to have flaked or scored them. Many of those found at the base of the Red Crag at Ipswich are scratched deeply, it is supposed by floating ice, and the edges are flaked from the same cause.

Mr Hazzledine Warren made a study of flints broken by the passage of cart-wheels and earth pressure, when the results produced are much the same as those flaked by ice or gravels. The American scientific expedition to the Gobi Desert noted that camels made quantities of eoliths when on the march.

Finally, the Abbé Breuil also wrote on his observations of the flints in the Lower Eocene sands at Belle-Assise, Clermont (Oise). M. Breuil proved that they owed their formation entirely to the solution of the chalk-beds in which the nodules were fixed. When the chalk gave way the overlying strata pressed heavily on the flints, and as the chalk collapsed erratically the flints were pushed in various directions and with differing degrees of pressure. This process either split off flakes or produced what are known as "bulbs of percussion," rather flatter than those produced by a direct blow. A bulb of percussion is a little swelling, a corresponding depression being found on either the flake struck off or the core left.

By the rubbing together of raw edges after a flint has been split by overhead pressure a rough copy of Mousterian flaking can be produced. Some results obtained in this way rather resemble the small tools of Azilian-Tardenoisean days. Similar observations were made by M. Commont and

Mr Hazzledine Warren, which shows the need for great prudence in making definite affirmations.

Mr Reid Moir found in and beneath the layer of Red Crag in Suffolk (a layer of Late Pliocene and Tertiary age) a fair number of implements of primitive form which he hailed as man-made. These included eoliths, unrolled flakes, and cores. As these eoliths in the upper level and some in the lower level are far apart they cannot have been subject to flaking by natural pressure, and they show no sign of having been battered by chance blows or rolled by water. On the other hand, they have been worked into scrapers and borers and show the secondary working known as retouch. Some are crackled, showing the action of fire. Another level containing similar flakes, sometimes retouched, was distinguished beneath the same Red Crag, and may indicate another settlement of the same people, but as there is evidence of very strong natural pressure being exerted in this region the flints cannot always be quoted as infallible proofs. These eoliths, shaped like the bow of a boat, with one side flat and the other having a central ridge with sloping sides, were called in Britain "cagles' beaks," or "rostro-carinates." M. Breuil and many others do not consider them man-made.

The Red Crag is a marine shore deposit of the time of transition between Late Pliocene level and the First Quaternary; it is superposed on the Coralline Crag, which was the last marine deposit of a warm sea, and ushers in the beginning of the colder conditions, which reach their culminating point in the Weybourn Crag, laid down immediately before the Forest Bed, where, as we have mentioned, was the workshop of the foreshore of Cromer.

Mr Reid Moir's discoveries were confirmed by the Abbé Breuil, Professor Marr, Mr Burkitt, and others, and the find was described as "a group of flint flakes, with much family likeness, which in the present state of our knowledge cannot be distinguished from those of human workmanship, and seem as likely to be made by man as by known natural processes."

We are dealing with longer periods of time than the

human mind can conveniently grasp ; our pride is rendered a little uneasy as we remark how much happened of progress, experiment, and variety before humanity as we know it existed. And this pride makes us seek for our ancestors, sure that such important creatures must be somewhere, and anxious that our arrival should be marked by an exhibition of supernatural forces and that our destiny should be heralded by a rending of what we call the laws of nature. It is a curious trait, this one of belittling humanity's achievements by suggesting a superior advantage at the outset and a lessening of the handicaps which beset all other forms of life on the globe.

The popular cry goes up, "Are we descended from monkeys?" What does man share with apes? He has the upright position, the opposability of the thumb and fingers, which in giving a fine sense of touch and grasp permits the development at the same time of the brain. The number of teeth, though not their volume, is the same in the apes and monkeys of the Old World and man, but not in the monkeys of South America. The free use of the hands, coming from the upright position, allows the brain to develop and the jaw to shrink, since the teeth are no longer used to hang on by or to snatch things with ; this shrinking of the jaw alters the nose and breathing apparatus and allows the lips to smile. No ape will suggest the brain-expansion and development of the nervous system which man attained, but what about the change long before Tertiary times from invertebrate to vertebrate animals, which was due to the improving of the nervous system? What of our body when examined in detail, the structure of blood corpuscles, the nerve cells, the muscles, the teeth? We can find their counterparts in sharks, in jellyfish, in worms. Our collar-bones have something in common with the protective plating of the great toads. We are not intruders on the globe ; we are a harmony of all that has lived on it. Our glory is that our greatest development tends to the unseen, intelligence and consciousness ; these are our contribution to the symphony of life. What does it matter if the building material is humble and varied if

the palace raised is an inspiration to future ages ? The need to see farther and higher still urges us as it once urged the creature first to stand upright ; the need to touch and taste and handle, the gift of tabulating experience and passing it on, are ours. Humanity's reign may pass as the reign of animals has passed, but at present we are the highest link in the chain which unites all creation.

CHAPTER XVIII

THE EARTH IN TERTIARY TIMES

Let all times, both present, past,
And the age that shall be last,
Vaunt the beauties they bring forth.

GEORGE WITHER

THE Tertiary Age has four divisions, Pliocene, Miocene, Oligocene, and Eocene, the earliest phase. The Pliocene and Miocene are the two divisions in the 'chapter' comprising half the age, a chapter known as the Neogene period, distinguished by the very great variety of the mammals, many of them of the type of to-day. The Oligocene and Eocene phases divide the first chapter in Tertiary times, called the Eogene period, distinguished principally in the marine deposits by a certain type of primitive organism living in a disk-shaped shell and called a nummulite. This is the time of the beginning of the great evolution of mammals from very primitive types to many monstrous kinds.

TERTIARY AGE

More modern chapter	Neogene	Pliocene Miocene	These chapters are so different that they practically represent two separate worlds.
Earlier chapter	Eogene or Nummulitic	Oligocene Eocene	

Neogene Period.—In what is known as the Neogene period of the earth, a period which has two subdivisions called the Pliocene and Miocene stages, the world was not very different from what it is to-day.

In Pliocene days the volcanoes of the central *massif* of France were very active. The Mediterranean formed a long loch ending in a lagoon in the valley of the Rhône, communicating with others of Central Europe.

The Tertiary Age is the time of the birth of the modern mountains, of the Alps, Pyrenees, Himalayas, and many other mountains—the Alps and Himalayas at the end of the Miocene stage, the Pyrenees between the Oligocene and Eocene stages. Part of Cornwall was submerged, but England and France were connected by a wide valley in the centre of what is now the English Channel. The polar regions had a mild climate. Up till the close of the Neogene period Europe and America were joined by a stretch of land reaching from what is now the eastern seaboard of America to Scotland, Ireland, Cornwall, Brittany, and the central plateau of France and Spain. Various upheavals sometimes introduced archipelagos, and finally, at the end of the Neogene phase, the severance which exists to-day took place. An Indo-African-Brazilian continent, including the present island of Madagascar, existed at the beginning of the phase. Australia broke away first from this continent.

North America and Asia could communicate by way of Spitzbergen and Greenland, and it was by this route that animals travelled, though they could not reach Europe, which was cut off by an arm of the sea. All these changes of the earth's surface produced great fluctuations in climate. At the end of the Neogene period Spitzbergen, now in the Arctic circle, could boast a flora which included magnolias and catalpas, poplar, walnut, elm, and hazel-trees, and the flora of Greenland was even more varied—beech, willow, maple, holly, hawthorn, oak, and birch-trees grew with dogberry, ivy, and the vine. In the South of England the flora was tropical at one period, and varied when a subsidence or upheaval of land brought winds from Arctic or tropical regions. Deciduous trees did not appear till Oligocene times.

There are three distinct zones of Miocene fauna, due to these geographical changes, the separation and reunion of continents producing these vagaries. These zones can be seen chiefly by the ape and monkey development from lemurs, which provided a great number of crosses, none of which took place in South America or the parts of the world

cut off before the Neogene period from the North-America-Europe-Asia continent, which is where man developed. As we shall see later, the development in apes was remarkable ; there were gibbons, chimpanzees, gorillas, orang-utans, and the before-mentioned *Dryopithecus*, an anthropoid ape combining the characteristics of the four types ; all these varieties descended from the lemurs of the earlier Oligocene period, which remain in Madagascar and India to-day, but in Pliocene times reached human stature.

Europe, Asia, and Africa were fairly homogeneous, and North America had a certain unity with Europe. All the animals that we know existed in these lands, but there were far more varieties. In Pliocene and Miocene times there were elephants of the dinotherium type and mastodons ; horses with one toe succeeded in Pliocene days the Miocene three-toed variety. The hippopotamus existed in the Pliocene ; the rhinoceros, at first without horns, grew them later. There were far more browsing animals than there are now, some enormous ones of the giraffe family, others like deer, very varied in the Pliocene, more primitive in the Miocene period. It is the great age of mammals, the time of the appearance of elephants and cattle, of horses, apes, and monkeys, of the rhinoceros, hippopotamus, and other thick-skinned creatures, many of which are now extinct. The mammals had existed in a much earlier age, but timidly ; they entered their kingdom in Miocene times and grew to an immense size, and in a mild climate with a sub-tropical vegetation they wandered about browsing under palm-trees, evolving innumerable types, till between the end and the middle of Tertiary times mammals reached the apex of their development, after which their power and suzerainty declined before that of man.

War waged between the various species. One type of rhinoceros, which had not yet evolved the horns which later were its chief defence, was attacked by carnivorous beasts. The dreadful sabre-toothed tiger (*Machairodus*) prowled about ; mastodons and dinotheriums came crashing through the forests. Antelopes had arrived ; there were creatures like giant pigs—tapirs ; and the cats, hyenas, bears, and

dogs of Late Tertiary times are not very unlike their modern counterparts.

The already-mentioned changes in flora had their effect on animal life. For example, the different types of horses are supposed to be chiefly due to the climatic changes they

RESTORATION OF MASTODON AMERICANUS
Height at shoulder, 9–10 feet.
In the British Museum (Natural History)

endured. There was the change from steppe conditions, when grazing was poor and speed encouraged by the enormous tracts of open flat country, to the times of thick forests, when grazing was found in glades and fast movement was impossible, and this more restricted but better-fed life produces a heavier-boned, broader horse, the slender, fast type owing its speed and build to steppe life.

Skeletons of two of the three-toed horses which roamed

the plains of Nebraska, and which were about the size of a Shetland pony, were found embedded in the Miocene and Oligocene beds of Nebraska by Dr Paul Miller, Curator of the Walker Museum, Chicago. He also found an early type of camel, between 8 and 9 feet high, and a giant rhinoceros.

America boasted a great number of animals strange to Europe, mostly emigrants from South America. During Pliocene times horses, deer, various felines, and the mastodon seem to have migrated from North to South America. A great many of the European animals seem to have come from Persia or India in Pliocene times, and as the horses and camels came to the Old World from North America the elephants were invading Europe from Asia.

Other parts of the world were peopled by more primitive animals. South America was distinguished by its extraordinary fauna. During the Neogene period strange types of toothless animals developed, such as the giant taton and the sloth (megatherium), as large as an elephant; they became extinct quite recently. They were eaten by Neolithic people of that country. More highly evolved types, such as those of the camel and horse families, first invaded South from North America.

As we have already said, the apes of South America had thirty-eight teeth instead of the thirty-two of the apes of the Old World. This primitive dentition is another evidence of the extreme antiquity of the simians and their evolution.

The parts of the world, such as Australia and elsewhere, which separated from the Northern continent even sooner than was the case with South America, show yet more primitive types of mammals, resembling the opossum and ornithorhynchus and kangaroos of Eocene type. Australia was the country of gigantic birds, such as the dinornis, which was destroyed by man in recent times, and of which the existing Australian emu is a very humble relation. Madagascar, separated a little later, had also an enormous ostrich-like bird, epicornis, which was likewise destroyed by man in recent times.

Eogene Period.—When we arrive at the Eogene or first

half of the Tertiary Age we are in a very different world from the present one. The fauna is very primitive, and the mammals especially small at first, as in earlier Jurassic days, but there is much variety in the different continents. The chief divisions in type had already appeared—the insect-

RESTORATION OF MEGATHERIUM AMERICANUM
The nose is about 12 feet from the ground.
In the British Museum (Natural History)

eaters, the flesh-eaters, the browsers, the group tending toward lemurs and apes, and the omnivorous creatures. All these animals were very far removed from their modern counterparts. They derived from most primitive forms, being modified, less exaggerated examples; the monsters, with their small heads and super-development of teeth and horns, did not survive, and most of the large Eogene animals are now extinct; but the creatures of medium develop-

ment are related and in many ways similar to the modern fauna.

The herbivorous mammals developed in two directions—the gallopers, which produced a hoof, and the browsers, with hoof cleft in two. The skulls of some of the biggest mammals were ridiculously small, and it is probable that they were not very intelligent.

We find in North America at this time the first ancestor of the horse, a little animal of the size of a dog, with no sign of a hoof, and can trace in the succeeding periods its growth in size and the progressive development from three toes to a hoof. Though there was great richness of the intermediary types of these various groups of carnivorous animals there were no cats, dogs, or wolves, hyenas, bears, or weasels, but a study of the animals which did exist shows the immense capacity of variation in different groups now quite unconnected.

The Austral-Indo-Madagascan continent was quickly breaking up; Australia separated once for all at this time, and her fauna remained the primitive fauna, chiefly of marsupial type. North America being joined to Europe, and South America to Africa, explains the simultaneous development of mammals in Europe and Africa, although the two Americas were separated one from the other where later they were joined by the Isthmus of Panama.

Modern excavations in the region of the Fayum, in Egypt, have thrown much light on the development of the fauna. There was a sort of little tapir called a mœritherium, which had two incisive teeth in each jaw so long that gradually the pressure when they met caused them to turn back. This creature had also a long, flexible upper lip—the first step toward an elephant's trunk. The development of the elephant's trunk was due to the fact that the great length of the incisors prevented the animal getting near its food, and so gradually the flexible lip had to reach out more and more, and the incisors became merely defensive and ceased to be teeth. So came in Miocene times the animal, now extinct, known as the mastodon, which had a trunk with a prehensile tip, and the dinotherium, whose tusks, first

growing downward, pressed on by the upper tusks, finally grew straight outward and were used by the animal for digging. As the tusks of these animals grew bigger their teeth disappeared, and as they spread they left room for the trunk to move freely.

The varieties and changes in the horns of mammals are

RESTORATION OF MŒRITHERIUM LYONSI
Height at shoulder, about 3 feet.
In the British Museum (Natural History)

as great and numerous as the changes in their teeth, and form an interesting study rather outside our province.

The Fayum showed the presence of a grass-eating monster larger than a rhinoceros, known as the arsinoëtherium, with two great horns on its nose, of three ancestors of the elephant, one being the mœritherium already described, and of a collection of monkeys of both Old and New

World types, showing what a long ancestry these creatures have.

An animal called the dinoceros, whose remains were found in the Rockies, had six horns and sabre teeth, otherwise resembling an elephant.

Enormous sharks swam in the seas, and tortoises and crocodiles lived in the lakes and rivers of Western Europe. Skeletons and even feathers and eggs of birds of this time are found preserved in the Eocene gypsum beds near Paris. M. Cuvier, who made a special study of animal remains in these gypsum beds, found an Eocene opossum there, as well as other kinds of marsupials, and there was a bird of the ostrich type.

In early Eocene times South America was inhabited by a great number of large mammals, grass-eaters, quite different from any existing animals. Such was the pyrotherium, which was of the size of an elephant and had four great tusk-like incisors. There was a very small prototype of a monkey, called homunculus, not unlike the existing tarsan ape of New Guinea, almost the same animal as was found in the Upper Eocene levels of North America and Europe. The tarsan is the first known relative of a primate, and already presented a great brain-development. No bigger than a mouse, it resembled in size many other contemporaneous mammals.

Chalk formations studded with little disk-shaped shells called nummulites belong to Eocene times. Nummulites are now extinct. Much of the chalk used in building materials contains shells of this age, and they are to be found in the stone used in constructing the Pyramids. The early part of Tertiary times, the Eocene Age, is often called the Nummulitic period on account of the enormous number of these shells abounding in the seas. Old coast-lines can often be traced by following the deposits of these nummulites.

Amber is the fossilized resin of a pine of Tertiary age, so we have reached the birthday of a substance which profoundly affected the movements of mankind.

A great variety of soil was deposited in Tertiary times

owing to the varied earth convulsions. Paris is built of the chalky stone of this age, and the flagstones of pavements are often of this date. The clay laid down then makes our pottery and bricks, and a very hard type of stone used for road-metal or millstones dates from Oligocene times. In some parts the rock-salt, the trade in which so affected the movements of peoples, dates from Eocene days. The volcanic streams form a material good for road-making. The beds of phosphates of chalk in North Africa and in France and the wells of petrol at Baku, on the Caspian Sea, all date from the Tertiary Age.

CHAPTER XIX

THE SECONDARY AND PRIMARY ERAS

So seethed the cloud and reeling from the gurge
Smelted and smoothened from the rough debris
By the hot hands of Fire, the Thaumaturge,
The Earth leapt free.

R. C. MACFIE

THE Secondary Era is marked by the advance and retreat of seas, as the Tertiary was distinguished by volcanic eruptions and upheavals of mountain chains, and the Quaternary by the advance and retreat of glaciers and the deepening of river-beds and valleys. Some idea of the great stretch of time of this age is gathered from the fact that the layers laid down during it are rather more than twelve thousand yards in thickness. These deposits are chiefly chalk and clay laid down by the action of water.

The era is divided into three periods, Cretaceous, Jurassic, and Triassic. The latest of these, Cretaceous, is so called from *creta*—that is, chalk ; Jurassic was so named because the deposits of the middle period are those of which the Jura Mountains are composed, a mixture of chalk, clay, and granulated chalk ; Triassic means in three layers, and was so labelled in Germany, where the deposits, when first studied, were found to consist of three layers, marl of Cretaceous age, chalk of Jurassic age, and a third deposit of sandstone, Triassic.

This is the Age of Reptiles ; mammals in their timid primitive stages existed, but were of little account. The creatures were not reptiles as we know them, but monstrous beings, such as the tyrannosaurus, nearly 47 feet long, its head 18 feet from the ground, a carnivorous horror. There were flying reptiles, swimming reptiles, and some which lumbered along the earth or clambered up trees, or placing two horrible hands round the trunk pulled down the foliage

within reach of a hungry mouth. The trachodon had one endowment many people would envy—its teeth as they wore out were replaced by another set, no small advantage when they might be as many as two thousand. There was a grass-eating dinosaur and a flesh-eating species. In the Cretaceous and Jurassic periods a great development took place in the crocodile and tortoise forms. The climate, which was extremely equable and warm and had no winter, favoured their growth, and if the rate of growth is still the same in the existing crocodile species those of the Secondary Age must have lived for more than five centuries to attain their length of 40 feet. The diplodocus, a sort of immense lizard, 87 feet long, had a long tail resting on the ground which served to propel the monster. It had a long neck and small feet, and seems constructed to force its way through dense brushwood with the help of its tail and neck.

There were flesh-eating reptiles walking like kangaroos, pterodactyls, or flying dragons, with membraneous wings like those of bats held out by one finger; and in the middle of the Secondary Era the first birds, half birds, half reptiles, with teeth, a long, lizard-like tail with feathers, and fingers ending in claws by which they could hold on, made their appearance. Toed reptiles which can jump are more modern than those walking on the centre of a pad. We are accustomed to think of reptiles as having no feet, because of the very inferior kinds which survive to our age, most of which wriggle along on their bodies. The cobra has undeveloped feet, but even our biggest snakes are most insignificant when compared with the rulers of the earth in Secondary times. By this very insignificance they survived. These monsters had two weak points, their ridiculously small heads, which did not permit of their developing any considerable degree of intelligence, and their system of blood-circulation. All went well as long as the climate was that of perpetual summer, but these lumbering, immense creatures take a long time to mature, and are not constituted for travel, so when the climate altered and periodic winters made their appearance the reptiles could not set off to find more suitable quarters, their brains were too

small to think out a way to protect their eggs or immature young, the cold made them torpid, and in time the more active carnivorous creatures must have eaten up the sleepy, half-frozen grass-eaters; and in their turn, since they had the same blood-circulation, the devourers must have

RESTORATION OF PTERANODON OCCIDENTALIS
Wing-span, 18 feet.
In the British Museum (Natural History)

perished, until the most enormous creatures which have ever lived were extinct. We find a skeleton embedded in the chalk, a footprint of gigantic size on some volcanic rock or in a clay bed, or some eggs fossilized into immortality.

Mr Roy Chapman Andrews, in charge of the third Asiatic Expedition sent out by the Natural History Museum of New York, while exploring the Gobi Desert, north-west of Peking, found various nests of dinosaurs' eggs. One nest

had twelve eggs arranged in two layers of six in a circle, the narrow ends pointing inward. They are thought to have been laid between five and ten million years ago. A sand-storm must have covered them soon after they were laid, and, burying the eggs, which were left to be hatched by the sun, cracked them with the sand's weight, so that the contents oozed away and the shells were fossilized, being filled with the wind-driven sand. The eggs of three different

DINOSAUR OF MONGOLIA

types of dinosaurs were found, forty specimens during the third expedition, and some two years previously. The smaller shells were smooth, and the larger kind dimpled. Dinosaurs had evidently their favourite hatching-grounds, since the nests were found in an area not more than 8 miles long by 2 broad. The smaller type of dinosaur was named *Protoceratops andrewsii* after the leader of the expedition. A cast made from a skull of one of these creatures found in 1923 was presented to the British Museum ; it is 21 inches long, more than 18 inches wide, and 16¾ in height. The same expedition found embedded in rock the remains of two types of very small and primitive mammals, which were assigned to the Cretaceous period, and were little larger than a rat. Deposits of dinosaurs' eggs have been

found in Tanganyika by British explorers, and discussions still continue as to whether the African or Asiatic uplands were the nurseries of the peoples and mammals of the earth.

In this world of monsters it is a relief to know that it was in Secondary times that the earth was first dowered

RESTORATION OF TRICERATOPS
Total length, about 20 feet.
In the British Museum (Natural History)

with flowers and all the humming, darting insect-life which feeds on and fertilizes them. The forests become gay with the glory of blossom; this is the compensation for the arrival of periodic cold seasons. Oleanders and viburnums, magnolias and palms, dogberry- and fig-trees, breadfruit-trees, and ivy grew in the forests, which were no longer of dark fir-trees, but of beech, oak, walnut, maple, plane, poplar, birch, and willow.

Those flowers which required the help of day-working insects put on the most brilliant tints ; those opening at night gave forth the sweetest scents to attract their helpers in the dusk. Only those fertilized by the wind-borne pollen needed neither gay colours nor sweet scent and could afford to be inconspicuous. The only objection to this theory, a theory worked out by man with his mania for arranging things tidily, is that it is based on the supposition that the eyes of insects see the same colours as the eyes of man. Now it has been discovered by Lord Avebury that some insects see ultra-violet, a colour which the human eye does not see, and it has been calculated that about 30 per cent. of conspicuous flowers are strongly ultra-violet. We see very few red flowers, but through the spectroscope 80 per cent. of conspicuous flowers are red, though they may seem to us white or yellow. Dr Lutz, in the course of his experiments, came to think that all colours from red to ultra-violet were found in light reflected from one flower or another, but that the flowers reflecting shorter rays (blue to ultra-violet) are more easily seen by flower-visiting insects, though the flowers reflecting longer rays (red to green) are more common. Insects are said to have a finer sense of smell than sight, but once again the subject is difficult to study on account of the difference in the olfactory sense of the human nose and that of an insect. It may be that the beautiful colours and exquisite scent of flowers are not so arresting to an insect as they are to humans. The delicacy of herbaceous plants prevents their preservation through the ages, so we do not find many actual remains, except for a few in coal. It must be remembered that the climate of these times was most favourable to insects, and they had a much longer spell of life than they do now. There were no sudden frosts to kill off a whole tribe in a night, and they lived long enough to protect their young, and pass on the discoveries they had made to the next generation. They had time to develop what we call their instinct ; they were not born with this ; it was the outcome of ages of favourable conditions so often repeated that they became part of their organism, and was transmitted by

what we call heredity. It was in Secondary times that the marvellous sense of order and government in ants and bees was developed. It was the coming of winter which arrested the advance of insects; those which could not mature in a year were killed by cold, and also those not intelligent enough to provide food and shelter for their young.

The most distinctive shells of the Secondary Era are those known as ammonites, from their resemblance to the curly horns with which the head of Jupiter Ammon was decorated. Ammonites rather resemble the nautilus in shape; they developed in various patterns, each pattern being confined to a distinct layer, so that they are invaluable in classification. There was also a sort of cuttlefish called a belemnite, from a Greek word meaning 'arrow-head.' These still contain a supply of fossilized sepia ink which can be used for painting.

Crabs and lobsters made their appearance in this age, and vertebrate fish. The ichthyosaurus was the chief sea monster, with crocodile teeth and body part-lizard, part-dolphin. Sea-urchins abounded, and the feathery "sea-lilies" so called bloomed on the ocean-bed. The mosasaur, a sort of sea-lizard, was 35 feet long.

Strata of the Secondary Age contain a great deal of mineral wealth. Iron ore, coal in South America, the Transvaal, and India, the clayey chalk which makes the most celebrated cements, such as Portland stone or the Grenoble cement, the classic marbles, the Grecian Parian and Italian Carrara, are of Jurassic age. Whiting, fuller's earth, fine chalk, and phosphates of chalk are all found in the strata; and in one part of Lorraine, in France, the deposits of rock-salt formed from the dried-up lagoons of the Triassic sea-coast are 64 metres thick.

The Secondary Era is sometimes called the Mesozoic Age, a name of Greek origin meaning the era of intermediate animals; the Primary Era is known as the Palæozoic, or era of ancient animals.

The Primary Era is divided into six periods: Permian, Carboniferous, Devonian, Silurian, Cambrian, Algonkian. Any deposits older than the last are called Archæan. These

periods have again subdivisions, which it is not necessary to enumerate in the short review of the subject given here. The Devonian, Silurian, and Cambrian periods take their names from different English districts where they were carefully studied, the Permian is named from Perm, in

RESTORATION OF ICHTHYOSAURUS
Reached a length of 30 feet.
In the British Museum (Natural History)

Russia, and the Carboniferous from the deposits of vegetation which form our coal.

Stepping backward into the Permian and Carboniferous times we find ourselves confronted with an appalling monotony—the climate unvaryingly warm, with no change of season, the trees of evergreen type, in a world which had never heard a laugh, a cry of joy or fear, a bird's song, which had never seen a flower nor a stretch of sward nor a butterfly.

The vegetation was luxuriant, but dull—mosses, horse-tails, hepaticas, and ferns, only such plants and trees as loved swamps. They flourished and gradually decayed in the still water, falling where they had grown. The evidence of their luxuriance is found in the great beds of coal, the source of much of our modern wealth. These are fossilized banks of decayed vegetation. The trees and plants growing in stagnant water rotted and sank down layer on layer, acted on when finally so thickly covered as to be excluded from air by marsh gas and carbonic acid gas, which decaying plant-life exudes, and probably by microbes. Coal is found in seams, often intermingled with layers of schist, a stone formed by the compression of fine sediment. As a rule, coal being composed of such soft decaying materials, the seams are distorted by earth-pressure in zigzags or steps, pushed this way and that, and one of the chief dangers for those mining it is in the pockets which may be come on unawares, spaces left in these earth-movements which fill with either water or marsh gas, cutting off the retreat or asphyxiating the workers.

It is in the Late Primary Age earths that we find most of our modern resources for lighting and heating, petrol in America, anthracite, and soft coal. Slate is found in the Silurian strata.

Spiders, centipedes, scorpions, salamanders, and giant dragonflies—these were the inhabitants of the globe. The reptiles had hardly begun, but a few skeletons of the most primitive, chiefly amphibious, kinds are in the layers of Permian age.

This era is sometimes called the Age of Trilobites, a sort of shellfish most developed in Silurian and Devonian times, and disappearing in the Permian stage. This shellfish was divided into three parts, head, thorax, and abdomen; it had feet used for both locomotion and breathing; in construction it somewhat resembled a woodlouse, and like it could roll itself into a ball.

Primitive fish, not having a completely ossified backbone, were encased in armour plating. Others had hard shiny scales and a backbone continuing down the upper part of the tail.

In these Primary times there was a boreal or Northern continent, of which Greenland was part, touching what is now Scandinavia and the North of Scotland, and extending across the Atlantic to Canada. There was a tropical continent connecting Africa with South America. Western Europe as we know it did not exist; it was submerged. The boreal and tropical continents were separated by a Greater Mediterranean Sea. The great Caledonian Range of mountains united Scotland to Scandinavia, and later another range ran from Wales through Brittany and the centre of France to the Vosges, Southern Russia, and Siberia. It is known as the Hercynian Range. In Silurian days two small islands, one in the centre of France and the other in Poland, were all that had emerged of continental Europe. England, half of Scotland, and all but the North of Ireland were under the sea. Volcanoes seem to have begun their work in Silurian times, and to have been very active in England. Perhaps their eruptions were the means of upheaving Britain from her ocean-bed.

The Primary Age beds are the ones in which the first fossils are found, but what was before? These insects, these rich, rank, silent, decaying forests, these marshes stagnant and rotting, the shellfish, this damp rankness of climate, the silence broken occasionally by the gigantic birth-spasm of a range of mountains or a continent—there must have been something before them. Ages of bacteria were necessary to prepare the earth for beings such as animals and plants, which cannot live without bacteria.

The foundations of the Primary Age fossil-bearing beds were laid on beds of gneiss and mica-schist and granite. The last is volcanic rock, the other two sedimentary ones, containing a great deal of crystal. It is in these beds that emeralds and topazes, garnets and sapphires, are found.

In the Algonkian beds there are no signs of anything resembling a fauna, nothing but a few worms and a trace or two of shellfish much crushed and deformed by pressure and the tremendous kneading, upheaving, and churning that soil and rock of this immense age have undergone. In the oldest Archæan beds of Finland there is some carbonaceous

matter, and a special kind of crystallized chalk formed of a sediment which may have contained organic matter. The traces of life are indecipherable through age.

What is this earth which is so tortured and rent, submerged and upheaved, drowned and blistered and hacked?

It is a child of the sun, older than Venus and Mercury, the other two planets born since. These three births reduced the volume of the sun and probably altered the colour. It is now a yellow star, but was perhaps once white or blue, as are other stars of greater heat. As a white or blue star the rays it sent to the earth would be chemically richer; as a star of greater volume it would light more of the earth's surface, which would produce the greater equality of seasons. Some authorities have stated that at one time the sun was so large that there was no night on the earth, and many scientists have tried to calculate the loss of heat it would suffer through radiation in the course of the ages.

All this would be outside our province if it were not that, like everything else, the earth is not independent, but moves through long cycles of time and endless changes to some goal unknown to us, and that the youngest of its living inhabitants moves entirely dependent on the sun. The sun is only one of millions of stars in a Milky Way, and from the day that, a nebulous mass, the earth separated from the sun it contained in condensed form all that it has evolved since.

Modern science has thrown great light on the earth's constitution; the discovery of radium, helium, uranium, and other associated end-products has helped in the study of its interior temperatures and its immense age. The present system of registering earthquake shocks makes possible a greater study of the elasticity of the surface crust and the question of strain and pressure. It seems likely that we are only at the beginning of the science of the chemical properties of the interior of the earth and their possibilities. The study of light is in its infancy; perhaps the capacity of the human brain to understand the problems which confront us is in the same stage. One thing is certain, death is transmuted life; from the self-destruction of radium hydrogen and

helium are born, from the destruction of heavy metals lighter metals are composed. Everything is in a state of flux and perpetual motion, attracted and repulsed, broken and re-created ceaselessly.

The part of the book of life which we can read is only a few pages : three-quarters has been made unreadable by the wear and tear of the ages, or we have not yet learnt the alphabet.

When we see the interdependence of all living creatures, the relationship of all mammals, the order in divisions of geological strata, the successions in the fauna in all periods of the earth's history, we are led to think that this union of all types of life is not accidental, but is part of some fundamental principle. Forced to think of life as a whole, our reason suggests that what exists at a given moment is the result of what preceded it, and that what follows a certain state of things is the result of that state. The idea of evolution is only the expression of the mutually dependent state of antecedents and consequences. The effort to explain this idea, which stirred such great minds as those of Darwin, Lamarck, and others, is but rudimentary groping, yet man can plume himself on the fact that he has realized the variations in type and their reappearances. Perhaps mechanical theories and classifications only explain the variations in type of organisms which already exist. But the roots of even these variations lie deep in the intimate chemical constitution of living matter. When it comes to the realization of a fundamental type and the striving upward to reach superior faculties it is hardly possible to avoid thinking that this is due to the hidden power of those dynamic principles which direct the expansion of all creation. The evolutionary theory of creation is therefore no mere hypothesis, but the result of our mental constitution ; it is the bedrock of Science—that is to say, the source of our knowledge of the Real. To reject it is to deny the capacity of our minds to understand it and to renounce all study except the accumulation of observations without sequence.

Our voyage of discovery is almost over, and yet hardly

begun. We have stopped hunting in the soil and turning over the dust of centuries, and stand gazing into space, problems of origin, atmosphere, strain, light, and heat dimly stirring in our brains. And, questioning thus, once more man exhibits his great endowment, his brain begins to construct and reach out, to grasp forces greater than himself. A pygmy in size, he yet perceives the Universe.

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